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THE GEORGE WASHINGTON UNIVERSITY
NAVY GRADUATE COMPTROLLERSHIP PROGRAM

A STUDY OF A MARINE CORPS RESERVE FINANCIAL MANAGEMENT PROBLEM

by

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Prepared for
DR. A. REX JOHNSON
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PREFACE

This paper presents a problem in the financial management of two million dollars. In an age when a million has almost ceased to be a practical measure of dollars of Federal spending, the devotion of four months study to such a small sum of money might appear to be a waste of time, at least to some persons. Yet the two million dollars of concern here is an important sum of money, for it pays for the transportation of 25,000 Marines to summer training each year. It is important to the officers and men who must administer the funds, since they are responsible for preventing over-obligation and over-expenditure. It is also important to the individuals who make the travel possible each year, the taxpayers. Thus any valid solution to the problem of estimating travel costs, the problem studied for preparation of this paper, will be important to at least a few individuals.

Sincere gratitude is extended to the Officers and Men of the Division of Reserve of the Marine Corps who helped in the study of Reserve travel. Special thanks are offered to Captain James S. G. Turner, U. S. Marine Corps, who not only presented the problem as worthy of study, but also gave his time in abundance to the study during the first four months of 1959. Without his profound knowledge of the problem area, and his frequent beneficial suggestions and criticisms, this paper could not have been written.

TABLE OF CONTENTS

Page

PREFACE ii

LIST OF FIGURES iv

Chapter

1. INTRODUCTION 1

The Problem

II. BACKGROUND 7

Appropriation Structure
Assignment of Units
Attendance of Personnel
Method of Travel
Costs of Travel
Estimating, Past and Current

III. A STUDY OF THE MILEAGE PROBLEM 20

Approach to the Mileage Problem
The Pattern of Assignments
Mileage Computations

IV. COSTING. 41

V. CONCLUSIONS 47

APPENDIX 49

BIBLIOGRAPHY 68

LIST OF FIGURES

Figure Page

1. Graphic Representation of Variables Affecting The Cost of An Organized Reserve Unit's Travel to Annual Field Training 5

2. Bases To Be Utilized During the Summer of 1959 . . 10

3. Organized Marine Corps Reserve Units Planned Assignments For Annual Field Training For The Summer of 1959 24

4. Curves Of Planned And Actual Travel, 1957-1959, Compared With Curves Of Appendix I 29

5. Organized Marine Corps Reserve Units Actual Travel Pattern For Annual Field Training, Summer, 1957, Media Usage 43

6. Organized Marine Corps Reserve Units Actual Travel Pattern For Annual Field Training, Summer, 1957, Cost Data 44

CHAPTER I

INTRODUCTION

The Organized Marine Corps Reserve[1] currently consists of 221 major units scattered throughout the United States, and 1 unit located in Hawaii. To provide a membership adequate to justify the expense of maintaining Reserve Battalions, companies and batteries, units are located in or near major urban areas. The densely populated cities generally have two or more units located nearby, with one major unit serving as a "controlling" organization, and the remaining unit or units serve as "satellites" of the controlling unit. Each unit is a member of a Marine Corps Reserve and Recruitment District, a geographic division of the 48 contiguous states into 7 broad areas. Thus each unit falls under the control of the Director of the particular Reserve and Recruitment District in which the unit is located. The District Directors are under the command of the Commandant of the Marine Corps. The Director, Marine Corps Reserve, is the Commandant's cognizant staff officer for Reserve functions. Thus the Marine Corps Reserve organizational pattern can be best described as decentralized operations centrally controlled.

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[1] Ground Reserve. The Air Reserve is not considered in this paper.

The Armed Forces Reserve Act of 1952, as amended by the Reserve Forces Act of 1955, provides for an annual Active Duty for Training period of 17 days or less for all Organized Reserve Unit members in a 48 Drill Pay Status[2] (a member paid for each drill attended up to 48, as opposed to the much less numerous 24 Drill Pay Status members, who may attend 48 drills, but who will be paid for only 24).[3] To meet this legal requirement, the Commandant of the Marine Corps assigns each of the 221 continental units to Annual Field Training at one of about 16 installations scattered throughout the country. The costs of transporting the units to and from Annual Field Training aggregate about $2,000,000 annually, and represent about 10% of the appropriation entitled "Reserve Personnel, Marine Corps." The problem of attempting to estimate accurately the costs involved in transporting the units is studied in this paper.

The Problem

Members of the Training Branch, Division of Reserve, Headquarters, U. S. Marine Corps, assign specific units to specific installations for Annual Field Training. At the

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[2] U. S. Congress, Armed Forces Reserve Act of 1952, Public Law 476, 82nd Cong., 2nd Sess., July 9, 1952, Secs 208 and 233(c); as amended by U. S. Congress, Reserve Forces Act of 1955, Public Law 305, 84th Cong., 1st Sess., August 9, 1955.

[3] Only 48 Drill Pay Status members are considered in this paper.

time of preparation of budget estimates (15 to 18 months in advance of the actual travel) assignments can, for many sound reasons, be classified as most tentative, and are frequently changed during the many months after budget estimates are submitted. Again for many sound reasons, the only completely stable rule followed in assigning specific units for training is that no unit SHOULD be sent to the same installation in two successive years. Thus the budgeteer (a member of the Budget Section, Logistics Branch, Division of Reserve) has only a vague idea of the actual destination of any chosen unit when he is preparing the budget estimates.

To get to their undetermined destination, members of a unit generally travel together as a group, in a legal status of group travel, as defined by Joint Travel Regulations,[4] although a limited number of men may travel individually in some cases. These groups range in size from about 20 to about 360 men. The actual number of men from a specific unit who will attend Annual Field Training is virtually impossible to estimate 15 to 18 months in advance, since the unit strength will probably change, sickness may develop, and most importantly attendance is mainly voluntary. Thus the budgeteer has only a vague idea of the specific number of men from a specific unit who will actually attend Annual Field Training.

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[4] The Secretary of the Army et al, Joint Travel Regulations, (December 22, 1950, with all changes through April 1, 1959), par. 4100.

To get to their undetermined destination, the groups of undetermined size may travel via any of eight different transportation media, at rates which vary not only among the media but also within the media (chartering a bus as opposed to individual bus tickets, for example). Transportation to and from terminals is frequently required, as in allowance for meals en route. The transportation eventually utilized by a specific unit will be affected by the number of men who actually go, the availability of specific types of transportation at the time, and the distance to be traveled, but is virtually impossible to determine 15 to 18 months in advance.[5]

For a single unit, a graphic representation of most of the possible variables in travel to and from Annual Field Training is presented in Figure I. Multiplying Figure I by 221 gives some idea of the problem facing the budgeteer. Thus, to put the problem in its most pessimistic form (and none too frivilously), the budgeteer must apply a price to the following statement: the movement of an undetermined number of men to and from an undetermined destination via an undertermined method of transportation. And, he'd better be right! As the incumbent Budget Officer, Captain James S. G. Turner, USMC, put it: "This is the only area of the Reserve Personnel appropriation where we aren't sure of

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[5] The problem is further compounded since the final assignment of transportation is made about 30 days in advance of travel by an organization belonging to the Department of the Army, (under the Single Manager Concept), the Military Travel Management Agency.

GRAPHIC REPRESENTATION OF VARIABLES AFFECTING THE COST OF ONE ORGANIZED RESERVE UNIT'S TRAVEL TO ANNUAL FIELD TRAINING.

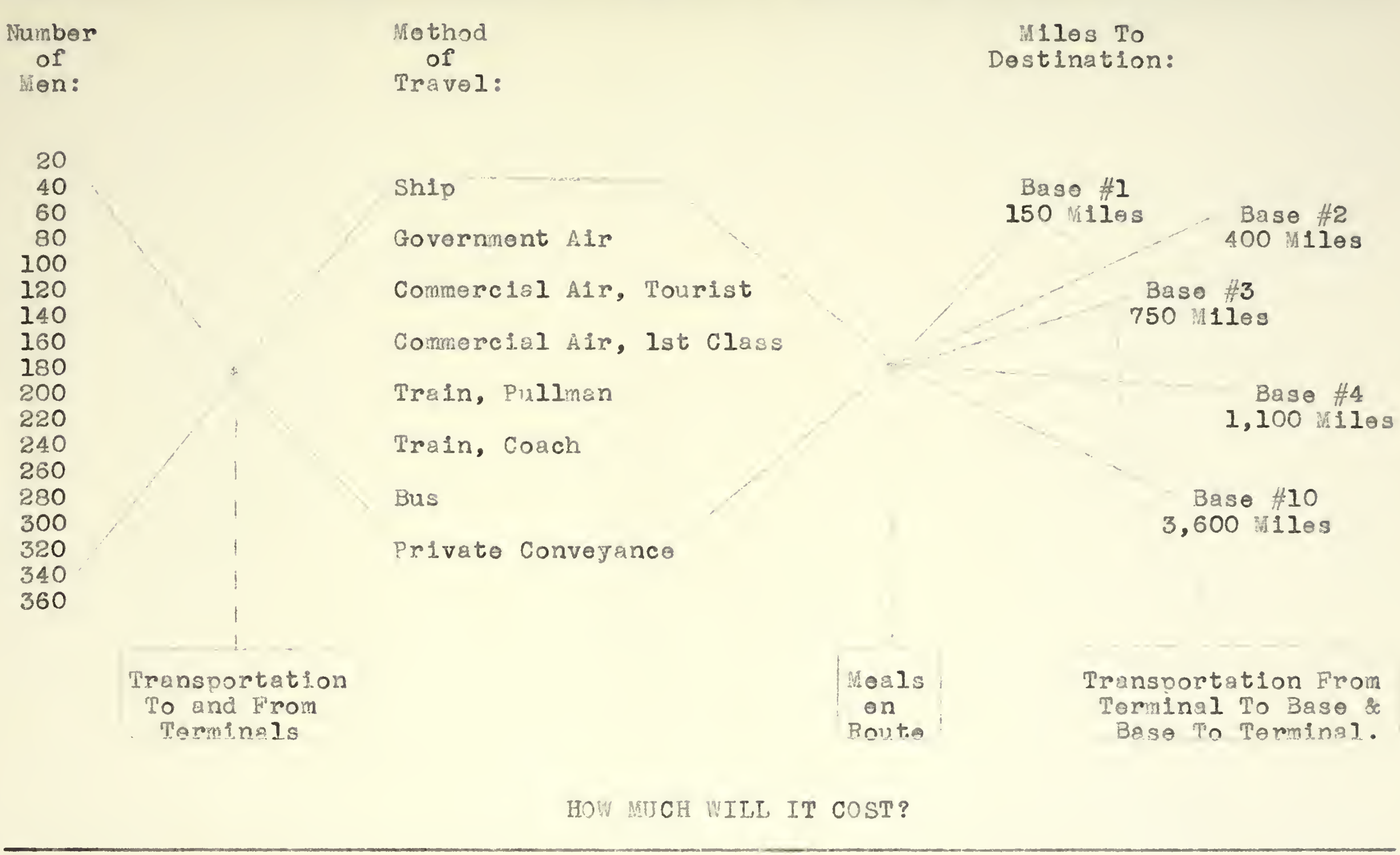

Figure 1

anything."[6] "The Marine Corps urgently needs to develop a system of estimating travel costs far in advance of the actual travel, for the prupose of securing and defending appropriations; and needs a system of estimating travel costs at the time incurred, for purposes of financial management."[7]

The purposes of this paper are: to present and analyze the detailed background of the problem; to describe and discuss a study made which provided a reasonably reliable method of estimating the total mileage traveled annually; to present an analysis of available cost data, and to present conclusions and recommendations drawn from the mileage and cost studies.

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[6] Conversation with the writer during February, 1959.

[7] Memorandum to the writer, dated February 18, 1959.

CHAPTER II

BACKGROUND

Before any new method of estimating Annual Field Training travel costs could be found, the details surrounding the problem area had to be examined. This Chapter presents, in brief, the detailed background of the problem sketched in Chapter I. The steps followed in presenting this background material are:

1. Presentation of the appropriation structure, to determine in what format costs must be reported.

2. Analysis of the assignment of specific units to specific bases, to determine what the budgeteer will know about assignments at the time of preparing budget estimates, and what policies he has for guidance.

3. Presentation and analysis of the factors affecting attendance at Annual Field Training, to determine what attendance estimates the budgeteer can use.

4. Presentation of some tentative conclusions concerning the methods of travel units will use, drawn from the geographic distribution of units and destinations.

5. Presentation and analysis of the accounting system under which travel costs are reported, to determine what help the accounting system can give the budgeteer.

6. Presentation of past and current methods of cost estimation, to determine in what ways they are inadequate.

Appropriation Structure

Funds for the transportation of 48 Drill Pay Status personnel to and from Annual Field Training are contained in the following classifications of the annual appropriation "Reserve Personnel, Marine Corps:"

Activity 1	Reserve Personnel
Project 1G	(Non-Aviation) Travel, Active Duty For Training, Officers
Sub-Project 1G1	Annual Tours, Training Pay Group A
Project 1H	(Non-Aviation) Travel, Active Duty For Training, Enlisted Personnel
Sub-Project 1H1	Annual Tours, Training Pay Group A.[1]

The Director, Marine Corps Reserve, is the project manager, submits allocation schedules, and receives allocations of funds. The detailed work of the Director's fiscal responsibilities is performed by the Budget Officer, Logistics Branch, Division of Reserve. Although Federal Budget estimates and reports of obligations incurred must be submitted in conformance with the above classifications, nothing prevents the costs being computed in the aggregate for all men, and an appropriate percentage of the aggregate being assigned the two Sub-Projects. The method of estimation proposed in this paper is an aggregative type.

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[1] U. S. Department of the Navy, Headquarters, U. S. Marine Corps, Budget Manual, Headquarters, U. S. Marine Corps, January 18, 1956, Appendix I, *passim*.

Assignment of Units

Officers of the Training Branch, Division of Reserve, prepare detailed recommended assignments of all Reserve units to specific bases for annual field training. The Director, Marine Corps Reserve, reviews and approves the recommended assignments and acting in the name of the Commandant of the Marine Corps, orders the units to the specific bases. Tentative assignments are first made in about April of the year preceeding the year of travel. After many changes, assignments become official upon issuance of a Marine Corps Order, generally in January of the year of travel. The Marine Corps Order is subject to numerous changes before the travel period actually begins.

In making the assignment of an individual Reserve unit to a specific base, the Training Branch has no written orders, directives or guidance to follow. Destinations are chosen primarily upon the basis of suitability for the training desired for various types of units. Figure 2 shows the bases to be utilized during 1959. Extant oral policy governing the assignment of units provides:

1. No unit shall be sent to the same base in two consecutive years, except when such action is:
    a. Unavoidable; or
    b. Necessary for economy reasons (the prime example being the Hawaii unit which never leaves Hawaii).

Bases To Be Utilized During The Summer Of 1959

1. Marine Corps Schools, Quantico, Virginia.
2. Marine Corps Base, Camp Lejeune, North Carolina.
3. Landing Force Training Unit, Atlantic, Little Creek, Va.
4. Marine Corps Recruit Depot, Parris Island, South Carolina.
5. Marine Corps Air Station, Cherry Point, North Carolina.
6. Marine Corps Base, Camp Pendleton, California.
7. Landing Force Tqaonong Unit, Pacific, Coronado, Calif.
8. Marine Corps Base, Twenty-Nine Palms, California.
9. Marine Corps Recruit Depot, San Diego, California.
10. Marine Corps Cold Weather Training Center, Bridgeport, Calif.
11. Marine Barraks, Vallejo, California.
12. U. S. Naval Base, Bremerton, Washington.
13. U. S. Naval Ammunition Depot, Hawthorne, Nevada.
14. U. S. Naval Ammunition Depot, McAlester, Oklahoma.
15. Marine Corps Supply Center, Albany, Georgia.
16. Marine Corps Supply Center, Barstow, California.
17. Marine Corps Air Station, Kaneohe, T.H..*

Source: Marine Corps Order 1540R.15A, dated January 14, 1959.

*The 27th Rifle Company, Pearl Harbor, T. H. is the only organized Reserve Unit going to Kaneohe, as it does every year, and neither Kaneohe nor the Rifle Company will be considered further in this paper.

Figure 2

2. Cross country travel is to be avoided, except for East coast Anti-Aircraft Artillery units, which are habitually sent to the west coast.
3. Units west of the Mississippi River, plus units in Minnesota and Wisconsin, habitually are sent to the west coast.
4. Units East of the Mississippi River, except as otherwise provided, are habitually sent to the east coast.
5. Units in Indiana and Illinois are sent to an east coast base every third or fourth year, and otherwise go west.
6. Each unit will be sent to a Landing Force Training Unit (either Little Creek, Virginia, or Coronado, California, as appropriate) every third or fourth year.

The only anticipated change to these oral policies is that for fiscal year 1961 and subsequently, east coast artillery units will be sent to the west coast every fourth year.

The budgeteer's problems would be vastly simplified if he could rely upon strict adherance to the six policies enumerated above. In so far as practicable, the Training Branch does follow the policies, but their own problems demand deviation. For example a large Air-Ground exercise at Camp Pendleton, California might have to be filled up with east coast units. Occasionally a base will be "closed" to Reserve

training for a year, as happened to Parris Island several years ago. In the main, however, the budgeteer can utilize the six policies as guidance for his budget planning.

The budgeteer's real problem in this area arises once the first tentative assignments are made. Shortly thereafter, the changes begin. A unit commander feels he can get a better attendance at a different time - changing his unit's schedule causes another unit to be reassigned. A unit commander discovers he can't obtain the appropriate means of transportation to get to the base assigned in the maximum travel time - his unit is reassigned. Air units can't meet a scheduled Air-Ground exercise - dozens of units are reassigned. The reasons for reassignment are quite sount, and reassignment is necessary, but as pointed out by Chapter I, the budgeteer thus never knows exactly which unit will go where until the travel is actually performed.

Attendance of Personnel

Only Reserve members who first enlisted after August 8, 1955 are legally obligated to attend Annual Field Training.[2] Since the remaining, and far more numerous, members are under no obligation to attend, the actual volume of attendance depends upon many factors, among which are:

1. Conflicts with civilian employment or education.
2. Sickness.

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[2] _Armed Forces Reserve Act of 1952_, _loc_. _cit_.

3. The Destination. (For example, Parris Island, S.C., sometimes draws a low unit percentage attendance, for reasons best known to anyone who has ever been there in mid-summer).
4. Leadership within the unit. (An enthusiastic and capable commander can probably get a high attendance percentage under any circumstances).
5. Fluctuations in the membership of the unit.

Even among those men legally obligated to attend, certain valid excuses may be offered for non attendance, such as job or educational conflicts. Thus, during the budget period, accurate attendance estimates for specific units are impossible to achieve, although the Manpower Section, Administrative Branch, Division of Reserve, produces reasonably accurate statistical estimates of the total attendance at Annual Field Training. Since individual unit figures are unreliable, the budgeteer must devise a system of preparing budget estimates based upon use of the estimate of the total number of men to attend Annual Field Training.

Method of Travel

As pointed out in Chapter I, predicting, 15 to 18 months in advance, the actual transportation media which will be used by a specific unit is virtually impossible. Some a priori deductions can be made about media usage, however. Since Annual Field Training is habitually of fifteen days duration, to provide the maximum possible training time,

logic demands that no more than one day be expended in travel in each direction. Therefore, a priori, units located between the Rocky Mountains and an area just east of the Mississippi River are quite likely to utilize some form of air travel, as are units in the upper New England and upper North West areas. Units bordering the zones just described are quite likely to utilize air travel or overnight train, and units situated quite close to their destinations are likely to utilize bus travel. Travel and cost data for calendar 1957, the only such data now available, are discussed in Chapter IV, wherein the above a priori deductions are tentatively borne out. The budgeteer must study media usage data as it becomes available, with the hope of finding an overall usage pattern that lends itself to preparation of budget estimates.

Costs of Travel

The costs of travel performed are known to the budgeteer only tentatively, and quite late after the fact. This situation is caused, in part, by the Marine Corps' accounting system, which does not lend itself to producing an accurate figure for a specific type of Reserve travel. All expenditures for Reserve travel are reported under the following system:

Accounting Project No.	Expenditure Account No.	Description
41		Officer Travel
	74600	Ground Officers
	74610	Aviation Officers
43		Enlisted Travel
	74620	Ground Enlisted
	74630	Aviation Enlisted.[3]

In both Projects, expenditures for Annual Field Training travel are lumped with, and are virtually undistinguishable from, expenditures for a whole gamut of Reserve travel, ranging from individual officers and enlisted attending schools, to the travel of many thousands of six month trainees to and from recruit training. Thus fiscal accounting records at best can give only a very broad picture of the obligations and expenditures for all types of Reserve travel as a whole. Even this broad picture is not available for some months after the close of the fiscal year, because of delays in submission and payment of carrier's bills. At the time travel costs are finally available, they are of purely academic interest, since the opportunity to expand or contract planned expenditures for the current fiscal year has passed. Thus the budgeteer must reserve funds to cover unexpected fluctuations in costs, thereby depriving the Reserve of the use of all the funds appropriated.

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[3] U. S. Department of the Navy, Headquarters, U. S. Marine Corps, Accounting Under The Appropriations "Military Personnel, Marine Corps," "Reserve Personnel, Marine Corps," and "Marine Corps Procurement," (Marine Corps Order 7301.17A, August 4, 1958), with Changes 1 and 2.

The situation described in the preceeding paragraph complicates another problem of the budgeteer. Units do not make a report of obligations incurred for Annual Field Training for the simple reason that, until the carrier finally works out the bill perhaps three months later, no one knows how much the bill will be. Yet the budgeteer must submit to the Bureau of the Budget a monthly statement of obligations.[4] Since actual obligations are not available, he must estimate them, without the aid of even reasonably current fiscal accounting data. Thus the budgeteer needs a system of preparing budget estimates which will also work for estimating obligations.

Estimating, Past and Current

Through 1957, budget estimates for Annual Field Training travel were derived by: (1) taking the tentative assignment of each unit, (2) calculating the mileage from the unit to the destination and back, (3) estimating the number of men from the unit who would attend, (4) guessing the medium of transportation to be used, (5) pricing the resulting man-transport-miles for each unit, and using the total of all units as the budget estimate.[5] The rates developed were also used for estimating obligations. Albeit based upon many laborious hours effort, the figures derived were no better than sheer

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[4] U. S. Bureau of the Budget, Instructions Relating To Apportionments and Reports On Budget Status, (Circular No. A-34, July, 1957), sec. 41.

[5] File, "Intiial FY1958 Budget Estimates, RPMC, " Budget Section, Logistics Branch, Division of Reserve, Headquarters, U. S. Marine Corps, for example.

[illegible] obligations.

[illegible]

[illegible]

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[1] [illegible]

[2] [illegible]

guesswork, for the many reasons already disclosed in this paper.

Realizing that a substantial error in estimating Annual Field Training costs could easily result in overobligating or overexpending the appropriation, officers of the Division of Reserve conducted a lengthy study of the problem during the winter of 1957-58. The study involved a large volume of correspondence with Reserve units, a searching of the accounting system for needed travel vouchers, and other laborious effort, in an attempt to ascertain the exact costs per man of Annual Field Training travel during the summer of 1957. Data was gathered on: (1) the method of travel of each unit; (2) the number of men traveling with each unit, (3) the costs of traveling, both "main haul" and to and from terminals, and (4) the costs of meals en route. Because the accounting system could not provide full disclosure, a few main haul travel costs were never found and meal costs had to be estimated. Since some bills had not been submitted at the time of the study, a few main haul travel costs had to be estimated. In the aggregate, however, an apparently reasonably accurate average cost per man was developed from the study. Since this cost figure ($74.97 per man)[6] represented a much more reliable guide than previous guesstimates, in March, 1958,

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[6] File, "AFT 1957 Study," Budget Section, Logistics Branch, Division of Reserve, Headquarters, U. S. Marine Corps.

all previous obligation estimates for Fiscal Year 1958 Annual Field Training Travel were adjusted to reflect this figure, and it is still being utilized, both for budget estimates and for obligation estimates. No other use was made of the data gathered for study.

The use of an historical dollar figure for present planning is hazardous, since carrier's rates may have changed, and more importantly, the present travel pattern may have no relation to the pattern which produced the cost of $74.96 per man. Thus the average cost per man, although a distinct improvement over past methods of estimation, still does not meet the needs of personnel responsible for management of funds for Annual Field Training travel. A similar cost survey could be done annually, and in fact is now being done for 1958, and is planned for 1959 travel, but the workload and cost involved in the study are such that a continuing study is not feasible. Further, the present method of studying the problem provides no indication of the relationship of one year's costs to another's, and no indication of the travel pattern. A change in the accounting system to provide adequate disclosure, though costly, is necessary, and is being studied as a long range objective by the Fiscal Division, Headquarters, U.S. Marine Corps.

Summary and Conclusion

The following summarizations and conclusions are drawn from the detailed background of the problem, as presented in this Chapter.

1. The budgeteer may use any reasonably accurate method of producing estimates of the costs of Annual Field Training travel.

2. The budgeteer can't determine the final assignment of specific units to specific bases at the time of budget preparation.

3. Attendance can be accurately estimated only in the aggregate, and not by specific units.

4. The budgeteer can't plan on having up to date obligation and expenditure data to help his planning.

5. Accurately estimating costs of travel, by specific units, is impossible.

6. Use of an historical dollar cost per man for estimation of costs of travel is inadequate.

Thus the problem can be solved only through use of some aggregative system of cost estimation. The budgeteer needs a system which utilizes an estimate of total attendance, an estimate of mileage to be traveled, and an estimate of current costs per mile traveled. Such a system must be flexible and and simple to use, and must bear a known relationship to past, current, and planned travel patterns. A proposed method of estimation fitting these requirements is discussed in the next two Chapters.

CHAPTER III

A STUDY OF THE MILEAGE PROBLEM

The analysis of Annual Field Training travel presented in the preceeding Chapter permits the problem of cost estimation to be subdivided into three smaller problems. These problems are: (1) men - how many men will attend? (2) miles - how far will the men travel? and (3) cost - how much will the travel cost? Within these three smaller problems only one immutable factor can be found - the mileage from each unit to each of its likely destinations. Since the total attendance can be estimated accurately at present, the unsolved problems are mileage and cost. As mentioned in the preceeding Chapter, the Division of Reserve is studying the costs of travel. The missing piece of the puzzle, then, is mileage. To supply this piece, three questions were asked. (1) Can a single mileage figure be derived which will represent the actual average miles each man will travel annually? (2) Would such a figure be accurate and subject to frequent verification? and (3) Could travel costs be estimated accurately through multiplying such a mileage figure by the total number of men to attend, and multiplying the result by average costs per man-mile? This Chapter and the next will present affirmative answers to these questions.

The steps followed in presenting the answers to the questions posed are:

1. A presentation of the basic approach to the mileage problem, to indicate the assumptions and deductions upon which the study of mileage from units to likely destinations was made.

2. A presentation of the actual pattern of assignments of units to bases, to determine to which destinations to measure mileage.

3. A presentation of the mileage computations, to include the steps followed, and logic used, in (1) deciding what kind of miles to use, (2) creating a mileage table, (3) deriving a single average, or mean, mileage, (4) determining whether the mean mileage accurately reflects the travel pattern, and (5) demonstrating how the mean mileage can be verified by the budgeteer.

4. A brief mention of how the mileage figure can be used in preparing cost estimates.

Since the system of estimating travel costs which is proposed in this paper requires a different form of costs than the Division of Reserve is now using, a separate Chapter is devoted to costing the proposed system.

Approach to the Mileage Problem

The basic assumption upon which the mileage problem was studied is that since all other factors change, only some

use of the immutable miles involved in travel can serve as a foundation for preparing budget estimates and obligation reports. The first deduction made was that since the destination of a specific unit frequently changes, the pattern of assignments of units would have to be studied to determine where each of the 221 units is likely to go over a period of years. Having determined the likely destinations, the actual mileage from each unit to each of the destinations would be computed, and an arithmetic mean taken for each unit. The second deduction was that this mean should represent the annual mileage, on the average, traveled by the unit and the men in the unit. The third deduction was that a single arithmetic mean of the 221 unit means should represent the annual mileage, on the average, traveled by all the units and all the men, if such a mean could be shown to be a valid representation of the travel pattern.

The Pattern of Assignments

Against the background of assignment policies outlined in Chapter II, page 9, the traffic at all destinations was studied for the calendar years 1957-59. The results, or the plans, showed a similar distribution for all three years, although some few minor destinations were dropped during the period. The planned traffic for 1959 is shown in Figure 3. Figure 3 does not show all the destinations listed in Figure 2 since Cherry Point, N. C. was included with Lejeune, and

Coronado was included with San Diego. In both cases the installations in question are virtually next door to each other. To determine to what destinations mileage should be computed, pure judgement was applied. Figure 3 shows Quantico, Bremerton and Barstow to be inconsequential traffic recipients. Vallejo, Hawthorne and McAlester were also regarded as relatively inconsequential, which left eight major destinations to which to compute mileage. Albany might have been discarded except that the installation is growing in importance and is likely to receive more traffic in the future. Use of the eight major stations for 1959 accounts for 93.48% of the men traveling, and 92.77% of the units traveling, which are both adequate percentages for cost estimation.

Mileage Computations

Having decided upon the destinations to utilize, a choice of the type of miles had to be made, either rail and/or air and/or bus. Since any measure from furlongs to miles, consistently applied, would give the same relative results, the choice was made on the basis of availability. The Official Table Of Distances provided a ready source of surface (rail and bus) mileages.[1] Thus the shortest surface mileage was computed from each unit to each likely destination. Appendix I contains the results of the computations. Appendix I is

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[1] The Chiefs Of Staff, USA & USAF, Official Table Of Distances, (AR 55-60, AFM 177-135, December 18, 1958).

Organized Marine Corps Reserve Units
Planned Assignments For Annual Field
Training For the Summer Of 1959.

Base To Which Assigned:	Estimated # of Men	Percent of Total Men	Number Of Units	Percent of Total Units
Quantico	106	.35	1	.45
Albany	1,019	3.32	7	3.17
Parris Island	1,591	5.19	16	7.24
Little Creek	3,512	11.47	23	10.41
*Lejeune	9,467	30.92	67	30.32
Pendleton	5,180	16.92	35	15.84
**San Diego	3,223	10.53	26	11.77
29 Palms	3,361	10.98	23	10.41
Bridgeport	1,270	4.14	8	3.62
Vallejo	808	2.64	5	2.26
Hawthorne	506	1.65	4	1.81
McAlester	305	1.00	4	1.81
Bremerton	159	.52	1	.45
Barstow	109	.36	1	.45
TOTAL	30,616		221	

Source: Marine Corps Order 1540R.15A, Dated January 14, 1959.

* Includes Cherry Point, North Carolina.
** Includes Coronado, California.

Figure 3

the first, albeit minor, contribution of this paper, since the mileages for Reserve travel had never been assembled before, and when needed, were puzzled out individually, accompanied by the headaches and temporary blindness induced by the 396 pages of the Official Table Of Distances. Although calculated with care by three persons (the writer among them), the mileages in Appendix I undoubtedly contain some errors subject to later in-use correction.

Appendix I also contains the mean of the miles from each unit to its likely destinations. This mean represents the miles the unit should annually travel, on the average, over a period of years. The mean of the 221 units were totaled, and the mean of the means, 1,096 miles was taken. This last figure, in theory, should represent the miles all 221 units should annually travel, on the average, over a period of years. Perusal of the "Mean" column in Appendix I reveals a wide dispersion of the individual means about the group mean. The standard deviation, 570 miles,[2] is immense, but, as will be later established, does not affect the use of the mean for budget purposes.

The mean mileage of 1,096 miles, by itself, does not reflect any variation in the size of the units. Therefore each unit mean mileage was weighted by multiplying by the

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[2] Computed by using: $\sigma = \frac{1}{n}\sqrt{n\Sigma X^2 - (\Sigma X)^2}$. The standard deviation of the individual raw miles is approximately 600.

number of men in the unit who are available for Annual Field Training in 1959.[3] The unit man-miles were totaled and divided by the total number of men. This process of first inserting and then withdrawing the men caused the mean to shift from 1,096 miles to 1,119 miles. The last figure theoretically represents the miles each man should annually travel, on the average over a period of years, assuming no change in the unit strengths. At first glance the mean of 1,119 miles should be a more accurate reflection of actuality than the mean of 1,096 miles. The weighted mean represents the groups of various size whereas the simple mean treats all groups as if they were the same size. For all the many reasons cited in this paper, however, the weighted mean is not usable. The impossible problem of predicting the number of men to attend from specific units again presents itself. Thus what had to be established was whether the mean of 1,096 miles multiplied by the total number of men would give a man-miles product approximately equal to the total man miles actually traveled.

The validity of using the mean of 1,096 miles for budget purposes was checked in the following manner:

1. Letting $X =$ miles, $\overline{X} =$ mean miles, $Y =$ men, and $Z =$ units:
   - A. Using the Official Table of Distances and the mileage table in Appendix I, compute, by units, the total man-miles ($\sum XY$) for:

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[3] "Manpower Availability, 31 Dec 58," Manpower Section, Administrative Branch, Division of Reserve, Headquarters, U.S. Marine Corps.

1) Actual 1957 Travel;
2) Planned 1958 Travel; and
3) Planned 1959 Travel.

B. Compute by years:

1) The total units (ΣZ);
2) The total miles (ΣX);
3) The mean miles ($\frac{\Sigma X}{\Sigma Z}$); and
4) The total man-miles ($\overline{X} \Sigma Y$).

C. Plot and fit freehand curves to:

1) A base (horizontal scale) consisting of 40 groups of 100 miles each (1-100, 101-200 etc):
2) Two frequencies (vertical scales) consisting of:
   - a. The number of men traveling in each mileage group on one chart; and
   - b. The number of units traveling in each mileage group on a second chart.

The results of curve fitting are shown in Figure 4. For comparability of magnitude, both units and men are expressed as a percentage of the total number of units or men for a particular year. Appendix I has been reduced to similar curves for purposes of comparison. The curves are all roughly the

same shape, which shows in graphic form that both units and men are similarly distributed, and that the travel pattern is approximately the same from year to year. Since the unit curves approximate the man curves, the unit mean mileage of 1,096 is useable for computing man-miles.[4] For example, multiplying 1,096 by the total men traveling each year, and comparing the product with the total man-miles (ΣXY) in each year, gives the following results:

	$\bar{X}\Sigma Y$	ΣXY	Error	% Error
1957	26,790,624	26,542,157	248,467	0.9
1958	39,482,304	39,155,534	326,770	0.8
1959	33,788,584	33,397,510	391,074	1.2

An error of 1% or so is a highly acceptable rate for Federal Budget purposes. An error of overestimation is more desireable than an error of underestimation, from the viewpoint of

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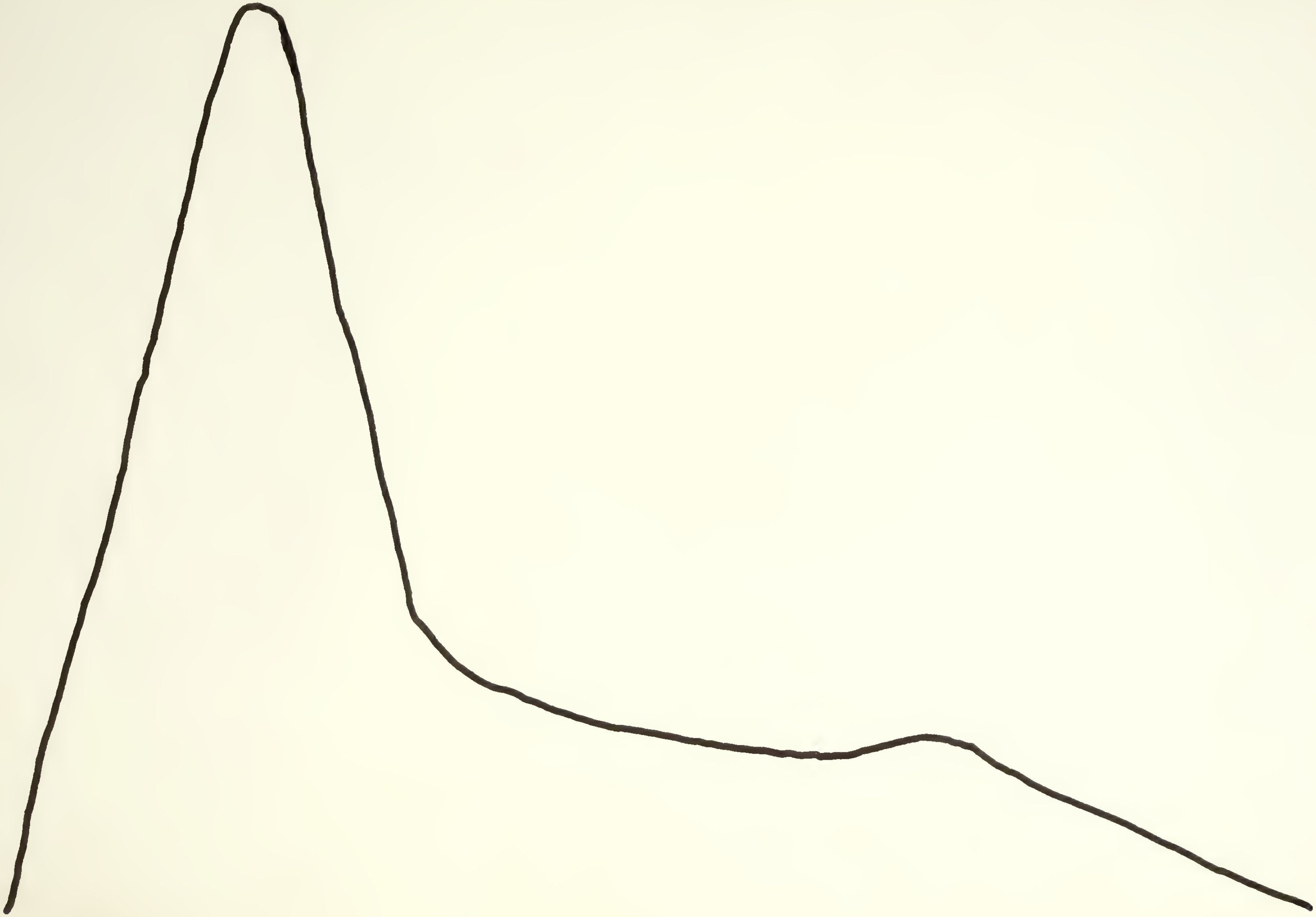
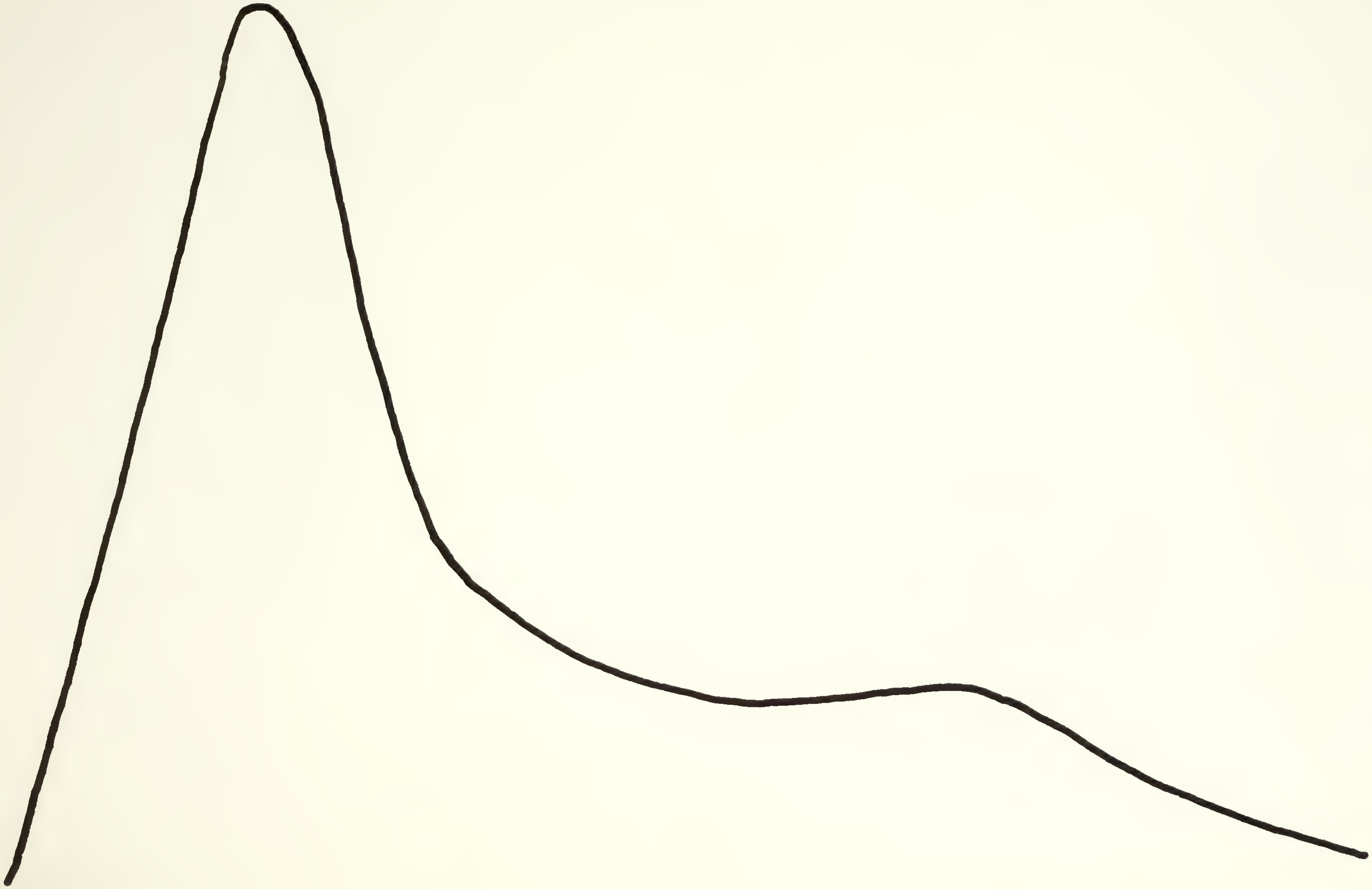
[4] The standard deviation does not affect the validity of using the mean in this case since the units are spread geographically over the curves shown in Figure 4. Thus the Midwest and Great Plains units are located at the high mileage end of the curves, etc. In addition, the distribution of units to bases each year prevents sending all units the longest, or the shortest, distances, for Albany and San Diego, being the longest distance from most units, would either be overrun with Reserves, or vacant, neither of which is likely. Thus so long as the policies of assignment to the various bases remains unchanged, curves of future travel, planned or actual, should be shaped like the curves in Figure 4.

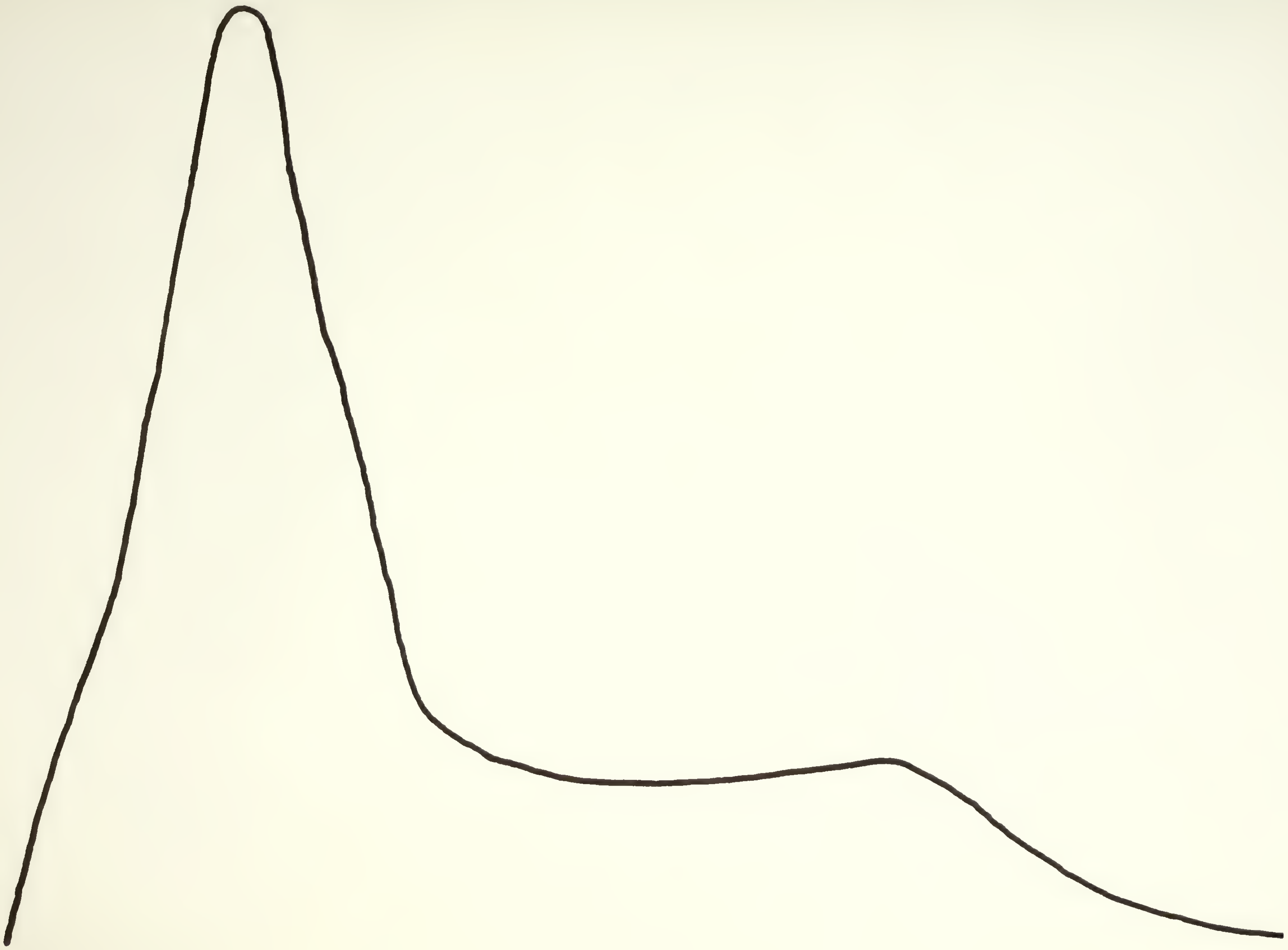
MEN, 1959 Planned Travel. Source: Marine Corps Order 1540R.15A, 14 Jan 59.



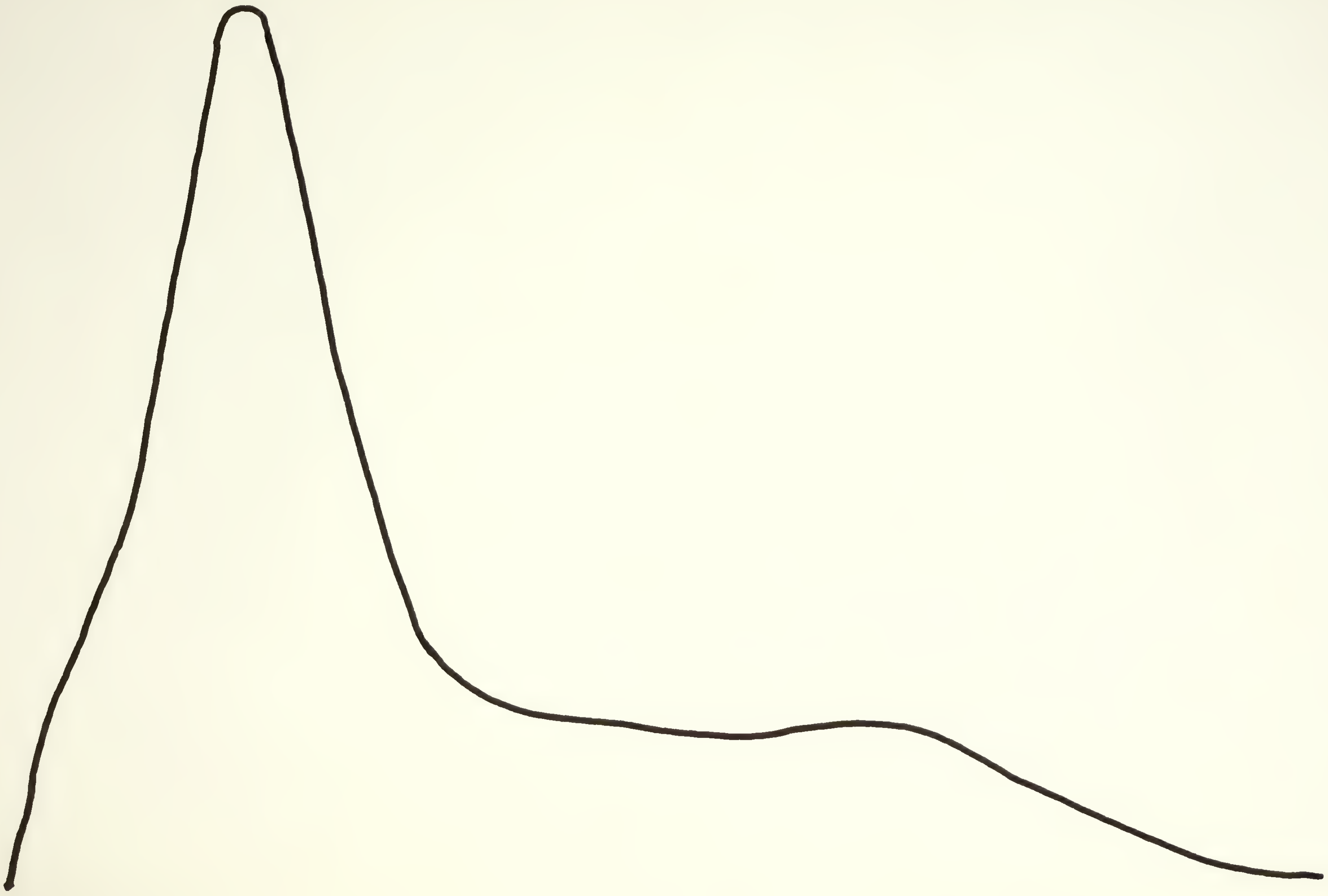
UNITS, 1959 Planned Travel. Source: Marine Corps Order 1540R.15A, 14 Jan 59.



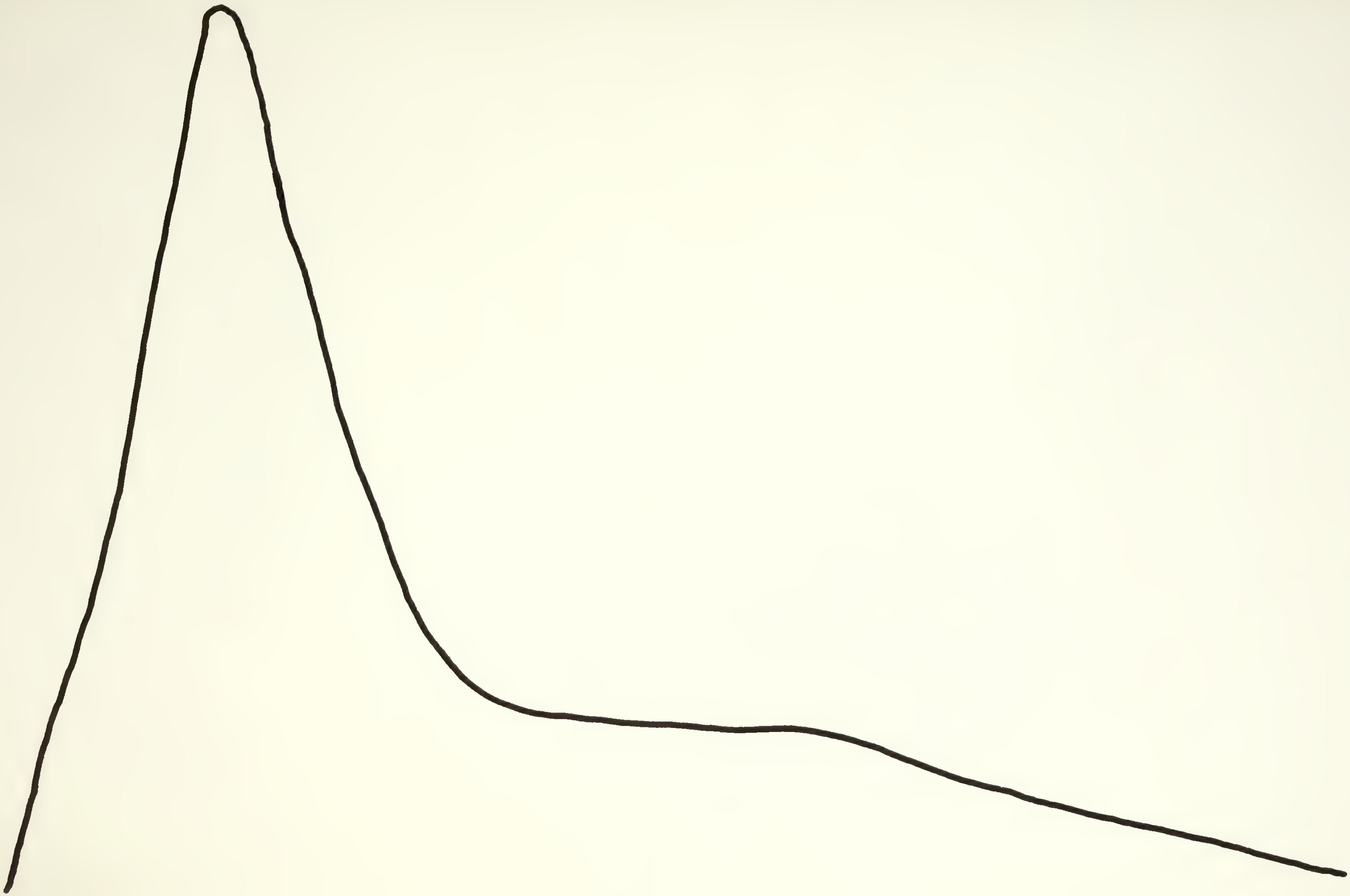
MEN, 1958 Planned Travel. Source: CMC letter AFM-1-bep, to distribution list, 14 Nov 57.

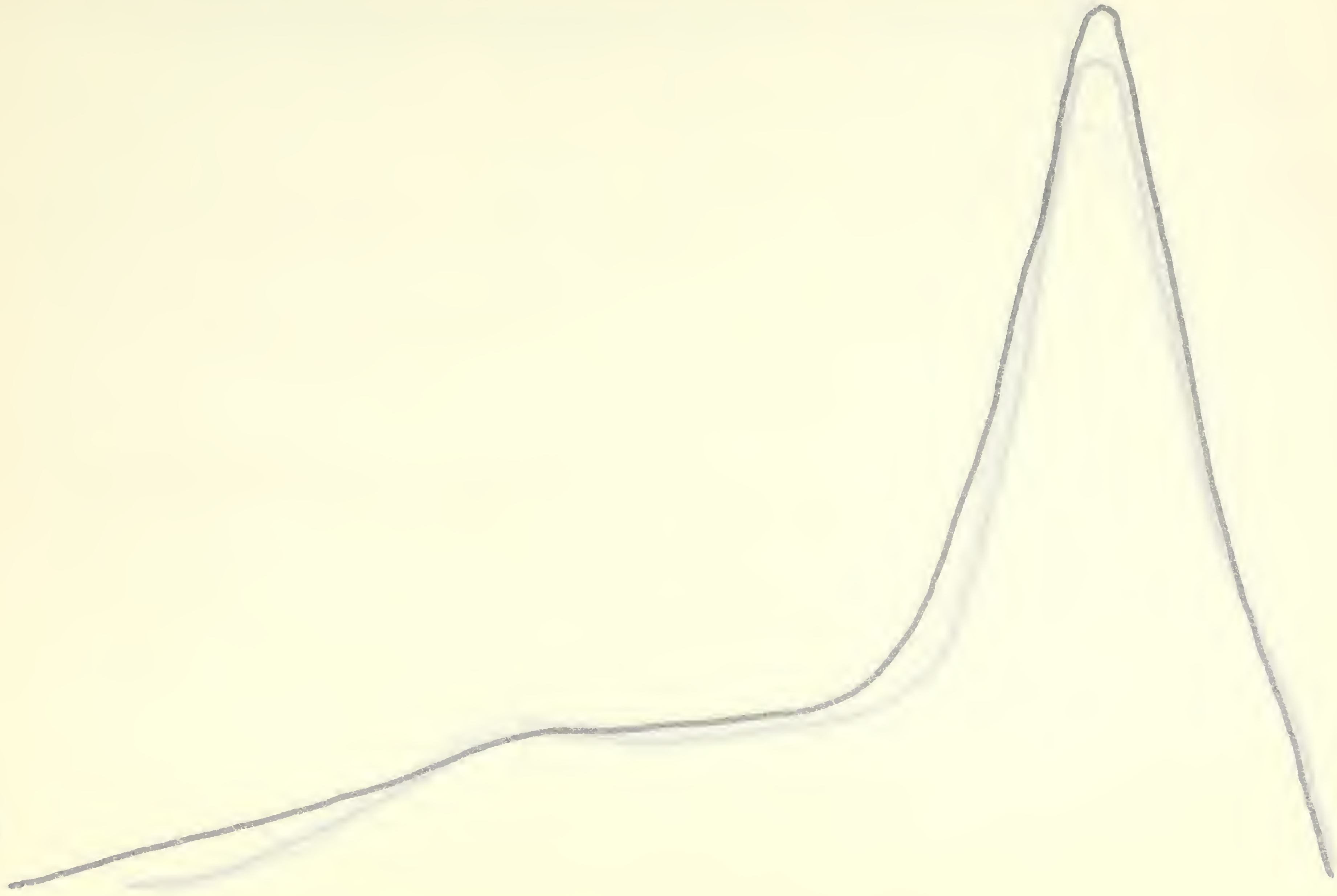


UNITS, 1958 Planned Travel. Source: CMC letter AFW-1-beo, to distribution list, 14 Nov 57.

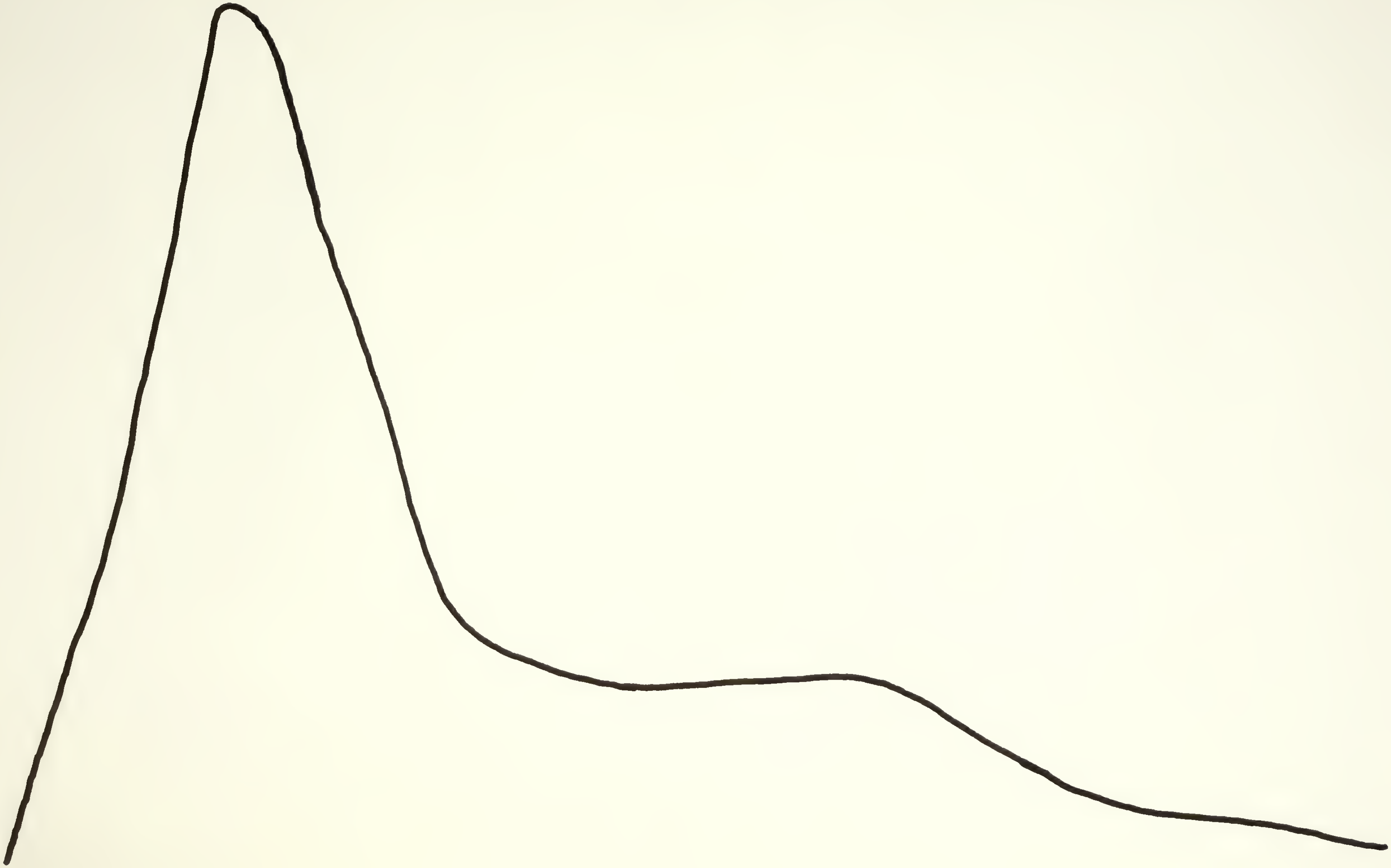


MEN, 1957 Actual Travel. Source: File, "AFT 1957 Study," BudSec,LogBr,DivRes,Hq,USMC.

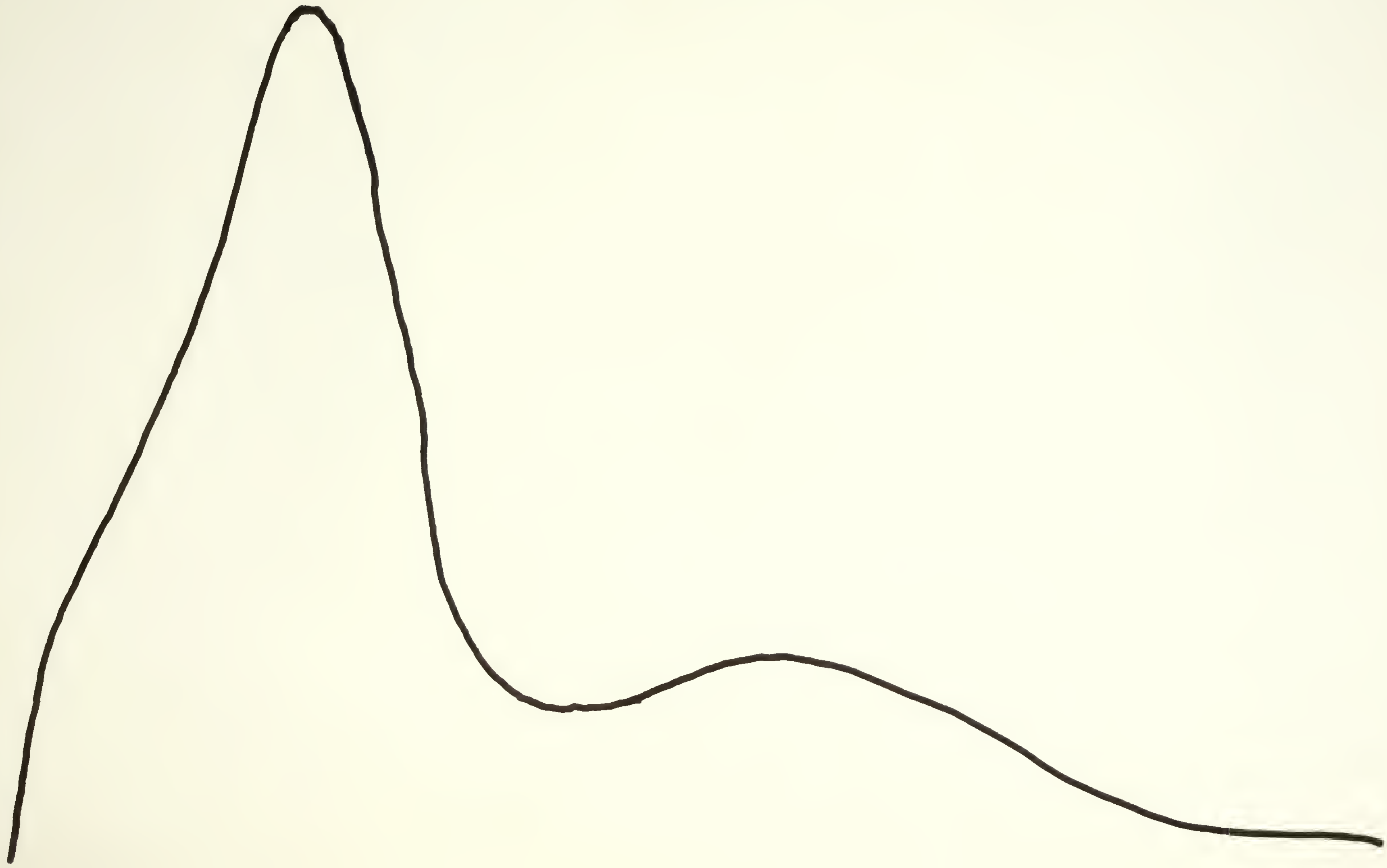




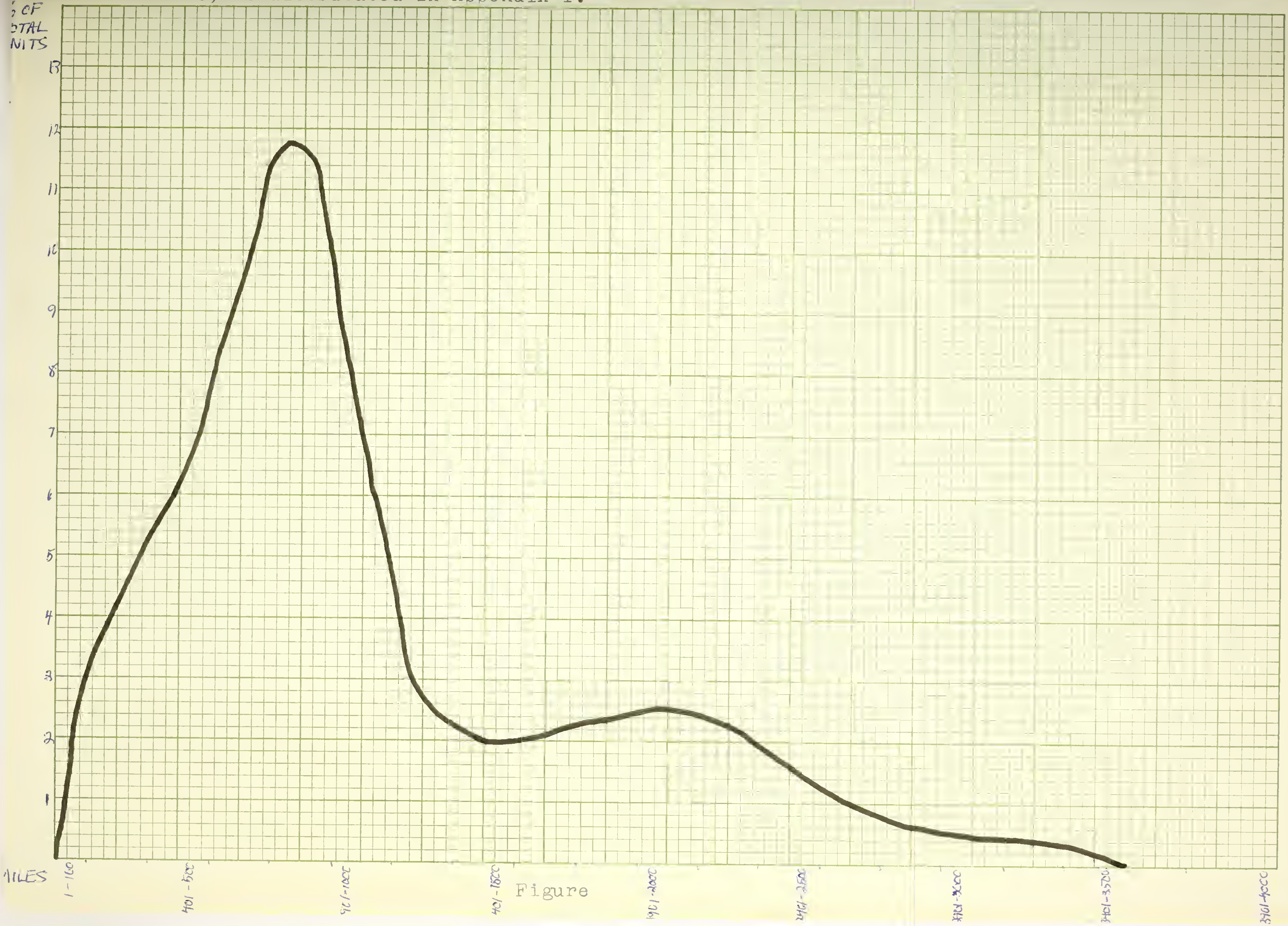
UNITS, 1957 Actual Travel.   Source: File, "AFT 1957 Study," BudSec,LogBr,DivRes,Hq,USMC.



MEN, As distributed in Appendix I.



UNITS, As distributed in Appendix I.



Figure

the appropriation sponsor, since it insures adequate funds.[5] Since the error rate is small, and the error lies on the proper side of the actual results, it seems safe to conclude that, so long as the policies upon which Appendix I were

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[5] The consistent overestimation is explainable as follows:

a. In Appendix I each destination was given equal weight - a specific unit has an equal chance to be sent to any of the destinations for which mileage was computed. In the aggregate, however, examination of Figure 3 reveals the distribution of units to destinations is far from equal. To be technically correct, each destination in Appendix I should have been assigned a weight and a weighted mean derived. Had this been done, the slightest shift in percentage assignment of men to destinations could cause the appropriation to be over-obligated, when using the weighted mean for budget purposes. The destinations were, therefore, deliberately left unweighted, which, because of the geographic distribution of the destinations, resulted in a mean mileage greater than that which would have been produced by weighting the destinations.

b. Since 1,096 is the mean of means, the distribution of units and men among mileage groups (as shown in the curves for Appendix I in Figure 4) has shifted to the right, resulting in a mean higher than that of any year distribution. The use of a mean larger than that of any year distribution is necessary at the outset, since any error of estimation must be an error of over-estimation. The use of a mean larger than the year group mean is necessary arithmetically, since the total man miles (ΣXY) of each year distribution is larger than the total man miles ($\bar{X} Y$) of the same year distribution. Even for Appendix I, the following results:

ΣXY	36,013,106	
$\bar{X}\Sigma Y$	35,258,320	
Error	754,786	- an error of UNDER estimation of 2.1%

Thus so long as the suggested checking procedure, which begins on this page above, reveals new curves to be substantially the same as curves for 1957-59, the use of 1,096 should give results accurate enough for budget purposes, and distinctly better results than past estimating methods.

calculated remain unchanged, the use of the unit mean mileage of 1,096 multiplied by the estimated number of men to travel will produce a man-mile figure acceptable for budgetary purposes. As a check, when the initial tentative assignment of units is made at budget time, the budgeteer can, in approximately two hours, get the individual mileages from Appendix I corresponding to the assignments, create frequency distributions, plot, and fit a freehand curve to the result, and compare with the curves in Figure 4. Any material abberation will necessitate investigation. No material change will indicate the use of 1,096 miles. Every six months or so after submission of the budget, a replot of the data, incorporating all changes in destinations, should be made to determine whether the curve is being materially altered. Any material change in the curve would require immediate action to forestall a possible over-obligation.

Although costing will be covered in more detail in the next Chapter, costs should be mentioned to complete the proposed process of estimation. The budgeteer would produce his estimated costs by multiplying the total man miles by the most current costs per man mile. The budgeteer can utilize the mean of 1,096 miles for monthly reporting of estimated obligations in similar fashion. When he receives the totals from the arrival reports[6] he has only to multiply the total

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[6] A report submitted by each Reserve unit upon arrival at a base for Annual Field Training. The report shows the number of men who arrived for training. The Manpower Section, Administrative Branch, Division of Reserve receives the reports, and submits the data to the budgeteer, among others.

men who traveled in the month by 1,096, and apply the current cost per man mile to arrive at the estimated obligations for one way travel.[7] (Simplicity of computations decreed the use of one-way miles throughout the mileage study, and when the figure of 1,096 is used, it must, of course, be doubled to get the round trip mileage).

Summary and Conclusions

The following summarizations and conclusions are drawn from the discussion and analysis of the study of the mileage problem, as presented in this Chapter.

1. On the basis of existing units, and existing assignment policies, 1,096 miles is a reasonably accurate representation of the actual miles each man will travel annually, on the average.

2. The figure of 1,096 miles is subject to frequent and simple verification.

3. Since the Manpower Section's estimates of total attendance are quite accurate, multiplication of total attendance by 1,096 will give a reasonably accurate total man-miles.

4. If costs per man-mile are estimated accurately, multiplying total man-miles by appropriate costs per man-miles will give a reasonably accurate estimate of the total costs of Annual Field Training travel, one way.

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[7] Annual Field Training begins and ends during a 90 day period. Thus at the end of any chosen month, a part of all the units have performed their travel. Since units are traveling from all sections of the country at any one time, 1,096 should represent the actual mean miles traveled during one month with reasonable accuracy.

At this point, all that remains is to determine accurate costs per man-mile. How to achieve such costs is the subject of the next Chapter.

CHAPTER IV

COSTING

Costing the man-mile system proposed in Chapter III requires development of historical costs on a man-mile basis, and a study of the historical transportation media usage of Reserve personnel. Since cost data is available only for calendar 1957 Annual Field Training travel, the best that can be done is examine that data and make recommendations for future study.

The Division of Reserve study of 1957 costs, previously mentioned in Chapter II, was directed toward, and provided, an average total cost per man. No attempt was made to produce data on transportation media usage, or on costs for each transportation medium, although raw data was gathered in these areas. The 1958 cost data are being studied in similar fashion, and the proposed study of 1959 costs is similarly programmed. To provide cost data to fit the system proposed in this paper necessitated restudy of the 1957 cost data, to produce:

1. The total units, men, and man-miles, traveled by:
    - A. Government Air;
    - B. Civilian Air; and
    - C. Surface Transport.

2. The costs per man-mile of each method of travel, and the cost per man-mile of the total man-miles traveled.

The distribution of units and men, by regions, among the various transportation media is shown in Figure 5. The facts of obvious interest in this Figure are the regional sources of transportation usage. The other West area[1] quite obviously traveled entirely by air, and in terms of men, predominantly by Civilian air. Most of the surface travel was generated by East Coast Units, yet one third of the East Coast men traveled by Government air. Thus the a priori deductions made in Chapter II concerning meida usage are borne out, at least as far as one year's cost data can do so. A representation of the aggregate travel pattern is shown in Figure 6, which indicates that the largest single block of man-miles was traveled by Civilian air, with an almost equal quantity traveled by Government air. Thus almost 80% of the total man-miles traveled were done so in aircraft. Although no legitimate conclusions can be drawn from one year's cost and media usage data, areas of interest can be highlighted. If 1958 and 1959 data reveal the same patterns as the 1957 data, man-miles could by priced as 40% Civilian air, etc., with strong confidence in the resulting dollar estimates. Such a system of pricing man-miles would be vastly superior to the use of an historical

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[1] Mainly the units in the 8th and 9th MCRRD.(La., Texas, Ark., Okla., Ia., Colo., Minn., Wisc., Mo., Nebr., and Kan.)

[illegible]

[illegible] is shown in Figure [illegible] [illegible]

[illegible] Government [illegible] civilian [illegible] Government [illegible]

[illegible]

Organized Marine Corps Reserve Units
Actual Travel Pattern For Annual Field
Training, Summer, 1957, Media Usage.

	Far West	Other West	Total West	AAA Arty.Ind. &Ill.	East Coast	Total of All Units
I. Unit Round Trips: (1)						
Surface	20	0	20	9	62	91
Govt. Air	17	19	36	9	33	78
Civ. Air	1	19	20	12	2	34
Ship	2	0	2	0	0	2
Total	40	38	78	30	97	205
a. # Of Men:						
Surface	2,657	0	2,657	1,101	5,951	9,769
Govt. Air	1,274	1,287	2,501	644	2,927	6,072
Civ. Air	82	2,181	2,263	1,402	319	3,984
Ship	284	0	284	0	0	284
Total	4,297	3,573	7,705	3,147	9,197	20,049
II. Unit 1-Way Trips: (2)						
Surface	1	0	1	2	12	15
Govt. Air	2	16	18	4	14	36
Civ. Air	1	16	17	3	5	25
Ship	0	0	0	1	1	2
Total	2	16	18	5	16	39
a. # Of Men:						
Surface	54	0	54	215	1,309	1,578
Govt. Air	195	1,854	2,049	398	1,350	3,797
Civ. Air	141	1,854	1,995	347	432	2,774
Ship	0	0	0	164	165	329
Total	195	1,854	2,049	562	1,628	4,239

Source: File "AFT 1957 Study," Budget Section, Logistics Branch, Division of Reserve, Headquarters, U. S. Marine Corps.

(1) The number of Reserve Units which used only one transportation media. The table reads for the first figure, "20 Far West Units traveled round trip by Surface." Ia shows the number of men in the units. The first figure reads, "2,657 Far West men traveled round trip by Surface."

(2) The Number of Reserve Units which used two different transportation media. The table reads for the first figure, "1 Far West Unit traveled one way by Surface." IIa shows the number of men in the units. The first figure reads "54 Far West men traveled one way by Surface." Since each unit and each man appear twice, The "Total" lines contain the actual number of units and men traveling round trip.

Figure 5

Organized Marine Corps Reserve Units Actual Travel Pattern For Annual Field Training, Summer, 1957, Cost Data

	# of Men*	Man Miles	Average Miles Per Man	% of Total Men	% of Total Man-Miles	Cost Per Man Mile
Ship (USN)	613	299,172	488	2.14	.56	$ 0
Govt. Air	10,025	20,277,446	2,022	34.95	38.20	.0163
Civ. Air	6,758	20,694,963	3,062	23.56	39.06	.0447
Surface	11,287	11,812,733	1,061	39.35	22.18	.0437
Total	28,683	53,084,314	-----	100.00	100.00	.0334

*Men Using Two Different Media Appear Twice.

Source: File, "AFT 1957 Study," Budget Section, Ligistics Branch, Division of Reserve, Headquarters, U. S. Marine Corps.

Figure 6

dollar total per man. How could the single dollar total per man be adjusted to fit a planned special air-lift? It obviously could not. Yet by pricing man-miles through use of the various media costs, an eminently flexible estimating system would result, adjustable to any changingtravel situation.

As an example of how the proposed system of estimating may be used, the following computations are shown, only as a demonstration, and not for the purpose of drawing any conclusions as to the validity of the system. At the time of preparing the Fiscal Year 1958 budget estimates, an attendance of 25,000 men at annual field training might have been a reasonable estimate. Thus multiplying 25,000 by 1,096 miles and doubling the product to get round trip mileage gives a result of 54,800,000 man-miles. Assuming, per Figure 6, that 1% of the man-miles would be traveled aboard ship, 38% by Government air, etc, the following would result:

Ship	548,000	man miles
Govt. Air	20,824,000	" "
Civ. Air	21,372,000	" "
Surface	12,056,000	" "
Total	54,800,000	" "

Applying the prices per man-mile in Figure 6 (rounding .5 to 1.0), would produce the following cost estimate:

Ship	@ $.0	$ 0
Govt. Air	@ .016	333,184
Civ. Air	@ .045	961,740
Surface	@ .044	530,464
Total		$1,825,388

The actual costs, as reported and estimated in the 1957 study, were $1,772,452.[2] Obviously, had the personnel estimate been

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[2] See Appendix II.

more accurate than the one arbitrarily chosen above, the results would be even better. It may prove in practice, however, that the personnel estimates are overstated and the estimated cost per man-mile understated.

The only conclusion possible from the data presented in this Chapter is that the costing area needs further study. It is recommended, however, that the 1958 and 1959 cost studies be reprogrammed to provide the same classifications of figures utilized in this Chapter, to determine whether any continuous or similar travel pattern exists.

CHAPTER V

CONCLUSIONS

The problem of estimating the costs of Annual Field Training Travel has been broken into three broad areas:

1. The total men to attend;
2. The total miles to be traveled; and
3. The cost of each man-mile to be traveled.

The use of a single total manpower figure has eliminated the errors possible when trying to estimate the attendance of specific units. The use of a single one way mileage has eliminated the need for guessing the destination of each unit and the mileage to be traveled by each unit. The cost data, when finally available, will provide a method of pricing the total man-miles which is flexible and responsive to changing transportation usage. The entire process of estimating travel costs will be simple and rapid. Not in any sense guaranteed to be foolproof, the system of estimation proposed is presented merely as a reasonably accurate tool subject to in-use study and correction. Possibly the real value of this study lies in some unemphasized finding which a reader in the Division of Reserve may well discover and put to use.

Thus no great issues have been tackled in this study; no resounding, deathless prose has been written. Only a small part of a small problem has been studied. The writer can only hope that something useful has been accomplished.

APPENDIX I

MILEAGE TABLE FOR 221 MAJOR RESERVE UNITS

Explanation

1. Each unit has been placed under one of five assignment policies. The five policies serve as headings for the five divisions of the Appendix.

2. One-way mileages were computed from each unit to each of its likely destinations for Annual Field Training. Mileages were derived from the Official Table of Distances.

3. The column titled "# Of Men" contains the number of men available for Annual Field Training in 1959, as calculated by the Manpower Section, Administrative Branch, Division of Reserve, Headquarters, U. S. Marine Corps, in their file "Manpower Availability, 31 Dec 58."

4. The column titled "Man-Miles" contains the product of multiplying the "Mean Miles" column by the "# Of Men" column.

5. In all computations, .5 was rounded to 1.0.

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE WEST COAST FOR FIELD TRAINING

		- - - - MILES ONE WAY TO - - - - -						
NAME	CITY & STATE	CAMP PENDLETON	SAN DIEGO	29 PALMS	BRIDGE-PORT	MEAN MILES	NO. OF MEN	MAN MILES
22dSpInfCo	ABERDEEN, WASH.	1414	1434	1376	967	1298	72	93456
1stCommBn	ALAMEDA, CALIF.	561	591	614	202	493	215	105995
8thAWBtry	BAKERSFIELD, CALIF.	267	297	320	305	297	140	41580
56thSpInCo	BELLINGHAM, WASH.	1503	1533	1556	1096	1423	112	159376
58thSpInCo	BILLINGS, MONT.	1551	1581	1604	1271	1402	64	89728
44thSpInCo	BOISE, IDAHO	955	985	1280	766	997	70	69790
36thSpInCo	BUTTE, MONT.	1316	1346	695	1036	1098	97	106506
21stSpInCo	COMPTON, CALIF.	78	108	131	409	182	133	24206
2d155GunBt	EUGENE, ORE.	1105	1135	1058	698	999	107	106893
4th75mmBtr	FRESNO, CALIF.	375	405	428	340	387	130	50310
102dSpICo	GREAT FALLS, MONT.	1457	1505	1251	1195	1352	62	83824
14thRiflCo	KENTFIELD, CALIF.	586	616	639	280	530	189	100170
5thCommCo	LONG BEACH, CALIF.	59	107	130	408	176	199	35024
2d155GunBn	LOS ANGELES, CALIF.	98	128	151	387	191	290	55390
45thSpInCo	OGDEN, UTAH	919	949	695	639	800	93	74400

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE WEST COAST FOR FIELD TRAINING (CONTINUED)

		- - - - MILES ONE WAY TO - - - - -						
NAME	CITY & STATE	CAMP PENDLETON	SAN DIEGO	29 PALMS	BRIDGE-PORT	MEAN MILES	NO. OF MEN	MAN MILES
7th75mmBtr	PASADENA, CALIF.	107	137	160	396	200	107	21400
9thEngrCo	PHOENIX, ARIZ.	418	370	273	752	453	181	81993
5thAWBtry	WHITTIER, CALIF.	93	123	146	392	188	151	28388
67thSpInCo	PORT HUENEME, CALIF.	166	196	219	438	254	123	31242
3dEngrBn	PORTLAND, ORE.	1211	1259	1282	822	1144	318	363792
49thSpInCo	RENO, NEV.	697	727	750	99	568	85	48280
2dTrkCo	SACRAMENTO, CALIF.	544	574	597	170	471	135	63585
3d155 GunBt	SALEM, OREGON	1176	1206	1285	925	1148	87	99876
21stRif1Co	SALT LAKE CITY, UTAH	865	900	659	899	831	161	133791
32dSpInCo	SAN BERNADINO, CALIF.	72	107	99	372	163	126	20538
7thInfBn	SAN BRUNO, CALIF.	561	591	614	256	506	278	140668
1stTankBn	SAN DIEGO, CALIF.	48		206	479	183	323	59109
2dArAmpCo	SAN FRANCISCO, CALIF.	550	580	621	262	504	167	84168
1stAAABn	SAN FRANCISCO, CALIF.	550	580	621	262	504	187	94248
5th75mmBt	SAN JOSE, CALIF.	540	551	574	309	494	138	68172

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE WEST COAST FOR FIELD TRAINING (CONTINUED)

NAME	CITY & STATE	- - - - MILES ONE WAY TO - - - - - CAMP PENDLETON	SAN DIEGO	29 PALMS	BRIDGE-PORT	MEAN MILES	NO. OF MEN	MAN MILES
1stAirDel	SAN JOSE, CALIF.	540	551	574	309	494	203	100282
13thRifCo	SANTA MONICA, CALIF.	97	145	168	370	195	270	52650
35thSpInCo	SANTA ROSA, CALIF.	622	652	675	146	523	90	47070
15thRiflCo	SEAL BEACH, CALIF.	54	102	177	413	187	169	31603
10thInfBn	SEATTLE, WASH.	1415	1445	1468	1008	1334	219	292146
6thAWBtry	SPOKANE, WASH.	1607	1637	1660	1202	1526	122	186172
4thSupCo	STOCKTON, CALIF.	496	526	549	148	430	144	61920
23dSpInCo	TACOMA, WASH.	1084	1114	1137	677	1003	118	118354
3dSupCo	TUCSON, ARIZ.	465	417	394	937	553	134	74102
64thSpInCo	TULARE, CALIF.	330	360	383	155	307	79	24253
66thSpInCo	YAKIMA, WASH.	1529	1559	1580	1213	1470	136	199920
1st155GunBn	DENVER, COLO.	1496	1526	1273	1217	1378	164	225992
20thRifleCo	DES MOINES, IA.	2044	2074	1820	1764	1925	110	211750
16thSpInfCo	DULUTH, MINN.	2397	2427	2203	2147	2294	80	183520
7thEngrCo	GREEN BAY, WISC.	2520	2550	2371	2315	2439	129	314631

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO
THE WEST COAST FOR FIELD TRAINING (CONTINUED)

		- - - - MILES ONE WAY TO			- - - - -			
NAME	CITY & STATE	CAMP PENDLETON	SAN DIEGO	29 PALMS	BRIDGE-PORT	MEAN MILES	NO. OF MEN	MAN MILES
2dWpnsBn	KANSAS CITY, MO.	1871	1901	1913	1857	1885	226	426010
94thSpInfCo	LA CROSSE, WISC.	2388	2508	2182	2126	2301	87	200187
86thSpInfCo	LINCOLN, NEBR.	1924	1954	1712	1700	1823	98	178654
4thAWBtry	MADISON, WISC.	2343	2373	2394	2338	2362	154	363748
16thInfBn	MILWAUKEE, WISC.	2394	2424	2377	2321	2379	229	544791
26thRifleCo	MINNEAPOLIS, MINN.	2270	2300	2052	1996	2155	201	433155
3d75mmBtry	OMAHA, NEBR.	1909	1939	1685	1629	1790	119	213010
95thSpInfCo	OSHKOSH, WISC.	2487	2517	1208	2166	2094	92	192648
30thSpInfCo	OTTUMWA, IA.	2133	2163	2003	1729	2007	56	112392
96thSpInfCo	PUEBLO, COLO.	1379	1427	1115	1090	1253	71	88963
55thSpInfCo	SIOUX CITY, IA.	1988	2030	1884	1610	1878	69	129582
12thRifleCo	SPRINGFIELD, MO.	2056	2086	2098	1942	2045	137	280165
3dInfBn	ST. LOUIS, MO.	2132	2180	2191	2135	2160	325	702000
101stSpInCo	TOPEKA, KAN.	1805	1835	1801	1789	1808	80	144640
3dAWBtry	WATERLOO, IA.	2144	2192	2037	1766	2035	97	197395

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE WEST COAST FOR FIELD TRAINING (CONTINUED)

		- - - - MILES ONE WAY TO - - - - -						
NAME	CITY & STATE	CAMP PENDLETON	SAN DIEGO	29 PALMS	BRIDGE-PORT	MEAN MILES	NO. OF MEN	MAN MILES
17thSpInfCo	WITCHITA, KAN.	1641	1689	1380	1472	1546	124	191704
87thSpInfCo	ABILENE, TEXAS	1311	1263	1288	1655	1379	105	144795
57thSpInfCo	ALBUQUERQUE, N. M.	867	819	705	1097	872	118	102896
88thSpInfCo	AMARILLO, TEXAS	1303	1255	1032	1639	1307	114	148998
13thSpInfCo	AUSTIN, TEXAS	1552	1504	1529	1896	1620	149	241380
33dSpInfCo	BEAUMONT, TEXAS	1763	1715	1731	2098	1827	103	188181
1stReconBn	CORPUS CHRISTI, TEXAS	1572	1524	1916	1549	1640	262	429680
1st4.5"Rock	DALLAS, TEXAS	1503	1455	1480	1847	1571	276	433596
19thRifleCo	EL PASO, TEXAS	858	810	835	1202	926	222	205572
92dSpInfCo	FORT SMITH, ARK.	1779	1731	1756	2082	1837	104	191048
3d105HowBty	FORTH WORTH, TEXAS	1472	1424	1449	1816	1540	150	231000
3dAmTracCo	GALVESTON, TEXAS	1729	1681	1706	2073	1797	97	174309
6thInfBn	HOUSTON, TEXAS	1670	1622	1647	2014	1738	404	702152
28thSpInfCo	LAFAYETTE, LA.	1897	1849	1874	2303	1981	162	320922
6thRifleCo	LITTLEROCK, ARK.	1865	1817	1842	2209	1933	169	326677

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE WEST COAST FOR FIELD TRAINING (CONTINUED)

		- - - - MILES ONE WAY TO - - - - -						
NAME	CITY & STATE	CAMP PENDLETON	SAN DIEGO	29 PALMS	BRIDGE-PORT	MEAN MILES	NO. OF MEN	MAN MILES
40thSpInfCo	LUBBOCK, TEXAS	1100	1042	1067	1434	1161	124	143964
47thSpInfCo	MIDLAND, TEXAS	1165	1117	1142	1509	1233	68	83844
4thInfBn	NEW ORLEANS, LA.	2042	1994	2019	2448	2126	286	608036
8thRifleCo	OKLAHOMA CITY, OKLA.	1578	1530	1555	1922	1646	268	441128
37thSpInfCo	PORT ARTHUR, TEXAS	1793	1745	1770	2137	1861	121	225181
91stSpInfCo	SAN ANGELO, TEXAS	1265	1217	1242	1609	1333	73	97309
14thInfBn	SAN ANTONIO, TEXAS	1451	1421	1446	1813	1533	318	487494
10thSpInfCo	SHREVEPORT, LA.	1696	1638	1566	2031	1733	78	135174
2d155HowBty	TEXARKANA, TEXAS	1720	1672	1578	2055	1756	85	149260
1stTruckCo	TULSA, OKLA.	1695	1647	1682	1829	1713	135	231255
2d75mmBtry	WACO, TEXAS	1560	1512	1537	1904	1628	79	128612
90thSpInfCo	WICHITA FALLS, TEXAS	1525	1477	1434	1618	1514	90	136260

USMC EAST COAST ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE WEST COAST FOR FIELD TRAINING

NAME	CITY & STATE	- - - - MILES ONE WAY TO - - - - -				MEAN MILES	NO. OF MEN	MAN MILES
		CAMP PENDLETON	29 PALMS	SAN DIEGO	BRIDGE-PORT			
1stCommSptBn	NEW YORK, N. Y.	3230	3143	3260	3025	3165	270	854550
1stAWBtry	AKRON, OHIO	2675	2613	2705	2661	2564	204	523056
2dAWBtry	CANTON, OHIO	2719	2661	2749	2705	2709	105	284445
7thAWBtry	CONNELSVILLE, PA.	2847	2761	2877	2805	2823	115	324645
1st75AAABn	FREEMANSBURG, PA.	3129	3042	3159	3086	3104	193	599072
6th75AAABtry	NEW CASTLE, PA.	2740	2678	2770	2726	2729	99	270171
2dCommSptBn	CHICAGO, ILL.	2322	2264	2352	2117	2264	251	568264
2d75GunBn	INDIANAPOLIS, IND.	2390	2332	2420	2376	2380	185	440300
9thAWBtry	JOLIET, ILL.	2297	2239	2327	2092	2239	143	320177

USMC ORGANIZED RESERVE UNITS SEN
FOR FIELD TRAINING EVERY F

NAME	CITY & STATE	- - - MILES ONE WAY TO - ALBANY	LEJEUNE	LITTLE-CREEK	P
9thInfBn	CHICAGO, ILL.	901	1054	983	1
80thSpInfCo	DANVILLE, ILL.	856	951	880	
17thRifleCo	EVANSVILLE, IND.	614	954	913	
1stWpnsBn	FOREST PARK, ILL.	910	1063	992	1
9thRifleCo	FORT WAYNE, IND.	885	905	834	1
25thRifleCo	GARY, IND.	876	1029	958	1
43dSpInfCo	GREAT LAKES, ILL.	933	1086	1015	1
19thSplInfCo	PEORIA, ILL.	952	1079	1008	11
20thSpInfCo	ROCKFORD, ILL.	987	1140	1069	11
2dOrdMaintCo	ROCK ISLAND, ILL.	1080	1238	1154	12
1stShorePty	SOUTH BEND, IND.	907	994	923	10
81stSpInfCo	SPRINGFIELD, ILL.	878	1241	1114	10

USMC ORGANIZED RESERVE UNITS SENT TO
FOR FIELD TRAINING EVERY FOURTH YE

		- - - MILES ONE WAY TO - - -			
NAME	CITY & STATE	ALBANY	LEJEUNE	LITTLE-CREEK	PISC
1st155HBtry	NEWPORT, R. I.	1235	793	674	1039
2d155HBn	PROVIDENCE, R. I.	1206	764	645	1010
1st155HBn	PHILADELPHIA, PA.	926	484	365	730
5th105HBtry	READING, PA.	985	543	424	789
3d155HBn	TRENTON, N. J.	960	518	399	764
1st105HBn	RICHMOND, VA.	678	235	116	495
3d105HBn	BIRMINGHAM, ALA.	259	676	772	464
1st105HBtry	CHATTANOOGA, TENN.	304	644	653	432
2d105HBtry	JACKSON, MISS.	512	929	1017	717
2d105HBn	MIAMI, FLA.	630	917	1032	588
4th155HBtry	RALEIGH, N. C.	599	130	184	432

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE EAST COAST FOR FIELD TRAINING

		- - - - MILES ONE WAY TO - - - -						
NAME	CITY & STATE	ALBANY	LEJEUNE	LITTLE-CREEK	PISC	MEAN MILES	NO. OF MEN	MAN MILES
46thSpInfCo	ALBANY, N. Y.	1210	718	599	964	873	97	84681
105thInfCo	AUGUSTA, ME.	1421	984	865	1230	1125	80	90000
48thSpInfCo	BINGHAMTON, N. Y.	1114	672	553	918	814	105	85470
2dInfBn	BOSTON, MASS.	1250	808	689	1054	950	441	418950
2dCommCo	BROOKLYN, N. Y.	1018	576	457	822	718	201	144318
29thSpInfCo	BUFFALO, N. Y.	1227	785	666	1031	927	129	119583
1stSpInfCo	BURLINGTON, VT.	1302	852	733	1098	996	63	62748
7thRifleCo	DOVER, N. J.	909	567	348	713	634	169	107146
1stInfBn	GARDEN CITY, N. Y.	1038	592	477	842	737	446	328702
70thSpInfCo	HARTFORD, CONN.	1127	685	566	931	827	125	103375
5thSupCo	HUNTINGTON, N. Y.	1058	616	497	862	758	80	60640
14thSpInfCo	JERSEY CITY, N. J.	1017	575	456	821	717	106	76002
3dOrdFldCo	LAWRENCE, MASS.	1258	844	725	1090	979	74	72446
23dRifleCo	LEWISTON, ME.	1401	959	840	1205	1101	74	81474
2dEngrCo	LYNN, MASS.	1281	831	644	1077	958	137	131246

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE EAST COAST FOR FIELD TRAINING

		- - - - MILES ONE WAY TO	- - - -					
NAME	CITY & STATE	ALBANY	LEJEUNE	LITTLE-CREEK	PISC	MEAN MILES	NO. OF MEN	MAN MILES
18thRifleCo	MANCHESTER, N. H.	1306	864	745	1110	1006	124	124744
52dSpInfCo	NEW BEDFORD, MASS.	1236	794	675	1040	936	74	69264
54thSpInfCo	NEW CASTLE, N. H.	1319	877	758	1123	1019	76	77444
2dAutoFldCo	NEW HAVEN, CONN.	1091	649	530	895	791	120	94920
3dSpInfCo	NEW LONDON, CONN.	1144	702	583	948	844	83	70052
2dRifleCo	NEW ROCHELLE, N. Y.	1035	593	474	839	735	191	140385
4thSpInfCo	NEW YORK, N. Y.	1018	576	457	822	718	118	84724
42dSpInfCo	PITTSFIELD, MASS.	1172	730	611	976	872	70	61040
24thSpInfCo	PORT NEWARK, N. J.	1008	566	447	812	708	128	90624
5thTrkCo	PORT NEWARK, N. J.	1008	566	447	812	708	124	87792
2dEngrBn	PORTLAND, ME.	1365	923	804	1169	1065	179	190635
3dCommCo	ROCHESTER, N. Y.	1157	715	596	961	857	201	172257
1stRifleCo	SPRINGFIELD, MASS.	1152	710	591	956	852	96	81792
2dTkBn	SYRACUSE, N. Y.	1153	711	592	957	853	245	208985
1stCommCo	WORCESTER, MASS.	1202	760	641	1006	902	184	165968

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE EAST COAST FOR FIELD TRAINING

NAME	CITY & STATE	- - - - MILES ONE WAY TO - - - - ALBANY	LEJEUNE	LITTLE-CREEK	PISC	MEAN MILES	NO. OF MEN	MAN MILES
5thSpInfCo	ALTOONE, PA.	1045	603	484	849	745	74	55130
39thSpInfCo	ATLANTIC CITY, N. J.	986	544	425	790	686	85	58310
68thSpInfCo	CAMDEN, N. J.	926	484	365	745	630	93	58590
4thCommCo	CINCINNATI, OHIO	1017	804	685	788	824	197	162328
11thInfBn	CLEVELAND, OHIO	1294	802	683	1048	957	300	287100
1stOrdFldCo	COLUMBIA, PA.	961	494	375	740	643	77	49511
27thSpInfCo	COLUMBUS, OHIO	790	1224	671	911	899	111	99789
2dSupCo	DAYTON, OHIO	721	856	737	841	789	101	79689
69thSpInfCo	EDDYSTONE, PA.	910	468	349	714	610	92	56120
4thTrkCo	ERIE, PA.	1115	776	657	1039	897	100	89700
71stSpInfCo	HAMILTON, OHIO	678	814	695	798	746	80	59680
62dSpInfCo	HARRISBURG, PA.	914	472	353	718	614	88	54032
34thSpInfCo	JOHNSTOWN, PA.	1006	721	602	982	828	85	70380
72dSpInfCo	LIMA, OHIO	796	932	813	926	867	77	66759
74thSpInfCo	MANSFIELD, OHIO	991	820	743	1077	908	102	92616

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE EAST COAST FOR FIELD TRAINING

		- - - - MILES ONE WAY TO - - - -						
NAME	CITY & STATE	ALBANY	LEJEUNE	LITTLE-CREEK	PISC	MEAN MILES	NO. OF MEN	MAN MILES
2dDepSupBn	PHILADELPHIA, PA.	926	484	365	745	630	225	141750
12thInfBn	PITTSBURGH, PA.	984	645	526	906	765	285	218025
75thSpInfCo	PORTSMOUTH, OHIO	780	692	573	676	680	64	43520
63dSpInfCo	POTTSVILLE, PA.	970	578	458	839	711	68	48348
6thTrkCo	FORTY-FORT, PA.	1052	604	485	865	752	83	62416
76thSpInfCo	STEUBENVILLE, OHIO	1027	688	569	949	808	78	63024
8thInfBn	TOLEDO, OHIO	862	915	794	1002	893	266	237538
8thSpInfCo	WILLIAMSPORT, PA.	1032	565	446	811	714	68	48552
16thRifleCo	WILMINGTON, DEL.	899	457	338	703	599	125	74875
1stAutoFldCo	FORTY-FORT, PA.	1052	604	485	865	752	98	73696
3dEngrCo	YOUNGSTOWN, OHIO	1049	710	591	971	830	163	135290
77thSpInfCo	ZANESVILLE, OHIO	827	692	573	938	758	72	54576
1stEngrBn	BALTIMORE, MD.	831	389	270	635	531	419	222489
1stSupCo	CHARLOTTESVILLE, VA.	703	307	188	567	441	79	34839
98thSpInfCo	CLARKSBURG, W. VA.	1069	619	500	865	763	49	37387

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE EAST COAST FOR FIELD TRAINING

NAME	CITY & STATE	- - - - MILES ONE WAY TO - - - - ALBANY	LEJEUNE	LITTLE-CREEK	PISC	MEAN MILES	NO. OF MEN	MAN MILES
6thSpInfCo	CUMBERLAND, MD.	945	495	367	741	637	64	40768
25thSpInfCo	HUNTINGTON, W. VA.	738	606	533	900	694	85	58990
61stSpInfCo	LEXINGTON, KY.	568	708	665	661	651	122	79422
7thSpInfCo	LOUISVILLE, KY.	652	878	749	715	749	105	78645
8thSpInfCo	LYNCHBURG, VA.	643	327	208	638	454	106	48124
97thSpInfCo	NEWPORT NEWS, VA.	740	212	8	535	374	73	27302
1stDepSupBn	NORFOLK, VA.	740	212	8	535	374	220	82280
60thSpInfCo	OWENSBORO, KY.	770	922	871	710	818	65	53170
104thSpInfCo	PARKERSBURG, W. VA.	767	635	562	929	723	78	56394
5thEngrCo	ROANOKE, VA.	683	379	257	648	492	118	58056
4thEngrCo	SO. CHARLESTON, W. VA.	688	556	483	850	644	80	51520
13thInfBn	WASHINGTON, D. C.	799	349	230	595	493	301	148393
1stMtrBn	ATLANTA, GA.	178	510	603	298	397	191	75827
2dTrkCo	AUGUSTA, GA.	222	335	521	127	301	109	32809
53dSpInfCo	CHARLESTON, S. C.	346	229	453	82	278	95	26410

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE EAST COAST FOR FIELD TRAINING

		- - - - MILES ONE WAY TO	- - - -					
NAME	CITY & STATE	ALBANY	LEJEUNE	LITTLE-CREEK	PISC	MEAN MILES	NO. OF MEN	MAN MILES
3dTrkCo	CHARLOTTE, N. C.	438	243	391	313	346	117	40482
89thSpInfCo	COLUMBIA, S. C.	407	340	394	203	336	113	37968
41stSpInfCo	DURHAM, N. C.	587	156	180	392	329	72	23688
26thSpInfCo	GREENSBORO, N. C.	532	211	235	419	349	97	33853
9thSpInfCo	GREENVILLE, S. C.	321	346	519	270	364	125	45500
1stArmAmphCo	GULFPORT, MISS.	363	936	1023	745	767	75	57525
2dAmphTracCo	JACKSONVILLE, FLA.	188	536	660	222	402	104	41808
31stSpInfCo	JOHNSON CITY, TENN.	521	473	434	397	456	120	54720
6thEngrCo	KNOXVILLE, TENN.	590	480	535	433	510	120	61200
1stServBn	MEMPHIS, TENN.	1240	929	955	717	960	285	273600
100thSpInfCo	MERIDIAN, MISS.	418	835	923	623	700	96	67200
1stAmphTracCo	MOBILE, ALA.	360	863	958	672	713	123	87699
38thSpInfCo	MONTGOMERY, ALA.	162	685	780	494	530	69	36570
3dRifleCo	NASHVILLE, TENN.	455	795	805	583	660	207	136620
2dShorePtyGp	ORLANDO, FLA.	334	683	813	369	550	102	56100

USMC ORGANIZED RESERVE UNITS ANNUALLY SENT TO THE EAST COAST FOR FIELD TRAINING

		- - - - MILES ONE WAY TO - - - -						
NAME	CITY & STATE	ALBANY	LEJENUE	LITTLE-CREEK	PISC	MEAN MILES	NO. OF MEN	MAN MILES
99thSpInfCo	RIVIERA BEACH, FLA.	486	835	965	521	702	94	65988
4thRifleCo	ROME, GA.	243	574	678	371	467	142	66314
5thRifleCo	SAVANNAH, GA.	215	337	527	83	291	149	43359
1stTkCo	TALLAHASSEE, FLA.	89	716	762	318	471	94	44274
1stAmphTracBn	TAMPA, FLA.	334	789	869	498	623	227	141421
22dRifleCo	WINSTON-SALEM, N. C.	509	230	282	454	496	111	55056
5thInfBn	DETROIT, MICH.	919	931	858	1047	939	410	384990
51stSpInfCo	FLINT, MICH.	979	1011	938	1127	1014	172	174408
10thRifleCo	GRAND RAPIDS, MICH.	1083	1083	1010	1199	1094	233	254902
84thSpInfCo	JACKSON, MICH.	993	934	871	1069	967	62	59954
3dShorePtyGp	KALAMAZOO, MICH.	974	998	935	1133	1010	143	144430
50thSpInfCo	LANSING, MICH.	1018	1018	945	1134	1029	118	121422

APPENDIX II

SUMMARY OF 1957 COST DATA

I. Cost and Mileage Aggregates:

Transportation	Man Miles	Total Cost	¢ Per Man-Mile
Ship	299,172	$ 0	0
Government Air:	20,277,446	330,605	1.63
Civilian Air:			
Reported Costs	19,922,762	890,968	
Estimated Costs	772,201	34,517	
Total	20,694,963	925,485	4.47
Surface:			
Reported Costs	10,957,129	478,972	
Estimated Costs	855,604	37,390	
Total	11,812,733	516,362	4.37
GRAND TOTAL	53,084,314	$1,772,452	3.34

II. Range of Individual Figures Within The Aggregates Above:

	Miles 1-Way	# of Men	Man-Miles Round Trip	¢ Per Man-Mile
Ship:				
Smallest	107	140	30,816	0
Largest	550	165	79,376	0
Government Air:				
Smallest	137	12	9,648	*
Largest	3,522	289	1,046,870	*
Civilian Air:				
Smallest	776	35	55,872	1.81
Largest	3,522	256	941,056	7.39
Surface:				
Smallest	48	27	16,224	1.22
Largest	1,058	343	472,680	9.02

* The Navy Bureau of Aeronautics bills the Division of Reserve one or more times annually for all Reserve Air Lifts. Thus the costs of travel could not be computed by units, but only in the aggregate.

III. Definition of Cost.

Cost was defined for the study of 1957 Annual Field Training as the total of the costs of:

1. Travel from the unit to terminals;
2. Travel between terminals;
3. Travel from terminals to the destination;
4. Travel from the destination to terminals;
5. Travel between terminals;
6. Travel from terminals to the unit; and
7. Meals en route.

Since the Bureau of Ships makes no charge for ship transportation, and since, by chance, the units traveling by ship incurred no costs, as just defined, ship transportation is shown as costless throughout this paper.

IV. Source and Miscellaneous.

The File "AFT 1957 Study" in the Budget Section, Logistics Branch, Division of Reserve, was utilized as the source of the cost study. This file contains data by unit (one page to a unit) covering all phases of the definition of cost in III above. Mileages from each unit to its destination were taken from Appendix I of this paper, and from the Official Table of Distances. The study made for this paper was set up on 14 column accounting paper, on a double entry basis, thereby requiring self-balancing, and insuring against arithmetic errors. In all computations .5 was rounded to 1.0.

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